

**Final Environmental Assessment
and
Finding of No Significant Impact
for the
Turley-Manzanares Acequia
Rehabilitation Project,
San Juan County, New Mexico**



25 September 2006

Prepared for:

**U.S. Army Corps of Engineers
Albuquerque District**

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FINDING OF NO SIGNIFICANT IMPACT

Turley-Manzanares Acequia Rehabilitation Project

The proposed rehabilitation work on the Turley-Manzanares Acequia will be conducted under the authority of Section 1113 of the Water Resources Development Act of 1986 (Public Law 99-662). The Act authorizes the Acequia Rehabilitation Program to conduct restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. Under Section 1113 of the Act, Congress has found that New Mexico's acequias date from the eighteenth century and, due to their significance in the settlement and development of the western United States, should be restored and preserved for their cultural and historic values to the region.

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with the New Mexico Interstate Stream Commission, and the Turley-Manzanares Community Ditch Association, are planning a project that will: 1) replace the existing heading structure with a gated heading; 2) install 1,200 linear feet of 36-inch reinforced concrete pipe; and 3) place wire-wrapped rip-rap along 103 feet of the embankment. Project construction is scheduled during the non-irrigation season with an expected duration of about four months. The Turley-Manzanares Community Ditch Association will be responsible for assuring operation and maintenance upon project completion.

The project area is located in rural, unincorporated San Juan County, New Mexico. The towns of Aztec, New Mexico and Bloomfield, New Mexico are approximately 20 miles northwest and 16 miles southwest of the project area, respectively. The village of Turley is located on the south side of the San Juan River, about one mile west of the project end. The acequia is fed from a diversion on the San Juan River. The acequia serves 20 landowners growing alfalfa and grass on approximately 270 acres.

The Turley-Manzanares Acequia is in need of rehabilitation because the existing system for delivering water is difficult and costly to operate and maintain. According to a USACE reconnaissance report prepared for this project (U.S. Army Corps of Engineers, 2002), high flows have eroded the berm that separates the acequia inlet channel from the San Juan River. The berm has been overtopped by high flows and some of its rock armoring has been washed away.

The proposed project will not change or affect water rights, or the amount of flows diverted. The proposed action will result in minor or temporary effects on soils, water resources, floodplains, wetlands, air quality, noise levels, terrestrial habitat, riparian and aquatic habitat, wildlife, special status species, visual resources, recreation, cultural resources and socioeconomics. The planned action was analyzed for, but will have no effect on, physiography, climate, geology, land use, and environmental justice. As required by the Endangered Species Act (ESA) of 1973, the Corps has determined that the project "may affect, not likely to adversely affect" the bald eagle. There will be no effect to any other threatened or endangered species receiving protection under the ESA.

Rehabilitation of the guide weir and construction of a new ditch heading will cause short-term increases in turbidity and suspended sediments from placement of fill, and operation of construction

equipment. The proposed action is the rehabilitation of an existing irrigation structure. Therefore, the project is not subject to the provisions of Sections 404 and 401 of the Clean Water Act (CWA). Best Management Practices will be utilized during project construction to prevent construction site erosion and storm water discharges.

Compensation for the loss of 1,290 ft² (0.03 acres) of wetlands and disturbance to riparian vegetation caused by implementation of the project will consist of on-site restoration and enhancement of 0.47 acres along the banks of the San Juan River immediately below and within areas disturbed by the placement of wire-wrapped rip-rap. Restoration and enhancement will entail planting coyote willow whips and cottonwood tree poles along the banks and within the interstitial spaces of the rip-rap at an appropriate elevation to ensure adequate moisture in the rooting zone. The project complies with Executive Order 11990, Protection of Wetlands.

Reseeding of disturbed soils surrounding the project area will be implemented in conjunction with the project. The construction contractor will use a mix of viable native grass seed to revegetate disturbed areas. These areas include those disturbed by construction machinery in upland terrestrial areas, as well as those areas used for staging equipment, storing construction materials, and parking vehicles.

The proposed project will result in minor, short-term effects to local air quality from heavy equipment emissions. An increase in particulates will be expected as a result of topsoil disturbance, as will localized concentrations of carbon monoxide from equipment during construction. Construction-related effects to air quality will be minimized by employing the use of Best Management Practices. Mechanized operation will conform to air quality control regulations as established by the Clean Air Act and the New Mexico Air Quality Control Act.

Implementing the proposed action will cause temporary increases in noise levels from the operation of heavy equipment. This increase will last approximately four months during day time hours. To reduce temporary construction noise, construction activities will comply with state and local noise control ordinances.

The Turley-Manzanares Acequia is eligible for nomination to the National Register of Historic Places. The proposed rehabilitation project will not adversely affect the acequia's alignment, form, nor its intended function, those historic elements that contribute to the acequia's eligibility for listing on the National Register. No prehistoric archaeological sites or other historic properties are known to occur within or in the immediate vicinity of the project area. Consistent with the Department of Defense American Indian and Alaska Native Policy, signed by Secretary of Defense William S. Cohen on October 28, 1998, tribes indicating an interest in activities in San Juan County (based on the State of New Mexico Indian Affairs Department's 2006 Native American Consultations List) were sent a scoping letter to assess if there were any potential tribal concerns with the project. No traditional cultural properties are known to occur within or in the vicinity of the project area.

The local area, upon further investigation, is potentially eligible for nomination to the National Register as a rural historic landscape. The acequia rehabilitation project will have no effect to the local landscape. The Corps, therefore, is of the opinion that the proposed Turley-Manzanares Acequia rehabilitation

project will have "No Adverse Effect to Historic Properties." Should previously undiscovered artifacts or features be unearthed during construction, work will be stopped in the immediate vicinity of the find, a determination of significance made, and a mitigation plan formulated in coordination with the New Mexico State Historic Preservation Officer and with Native American groups that may have concerns in the project area.

Implementation of the proposed action is expected to economically benefit the Turley-Manzanares Community Ditch Association by reducing long-term maintenance costs. In addition, construction of the project will provide some short-term economic benefits for local businesses in northwestern New Mexico. The planned action is being coordinated with Federal, State, and local agencies with jurisdiction over the biological and cultural resources of the project area. Based upon these factors and others discussed in the following Environmental Assessment, the proposed action is recommended and will have negligible effects on the human environment. Therefore, an Environmental Impact Statement will not be prepared for the proposed rehabilitation work on the Turley-Manzanares Acequia.

26 Sep 06
Date



B. A. Estok
Lieutenant Colonel, U.S. Army
District Commander



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Appendix A	Public, Agency, and Tribal Scoping, Consultation and Coordination
Appendix B	Cultural Resources Survey Report
Appendix C	USFWS Coordination Act Report
Appendix D	Public and Agency Comments on the Draft EA



1.0 PROJECT PURPOSE AND NEED

1.1 Background and Location

The Water Resources Development Act of 1986 (Public Law 99-662) authorized restoration and rehabilitation of irrigation ditch systems (acequias) in New Mexico. Section 1113 of the Act recognizes the historic significance of the acequias and their relationship to settlement and development of the Southwest. The Act authorized the Secretary of Defense to undertake measures to protect and restore acequias in the Southwest. The Act also recognized community acequias as public entities, allowing acequia officials to serve as local sponsors of water related projects through the Department of Defense.

In New Mexico, the acequia rehabilitation program is managed by the U.S. Army Corps of Engineers, Albuquerque District (USACE) and the New Mexico Interstate Stream Commission (ISC). At the request of the ISC and Turley-Manzanares Community Ditch Association, USACE conducted a reconnaissance investigation of the Turley-Manzanares acequia in 2002 (U.S. Army Corps of Engineers, 2002).

The Turley-Manzanares acequia diversion is located on the San Juan River in San Juan County, New Mexico (SE 1/4 Sec. 35, T. 30 N., R. 9 W., N.M.P.M.), approximately 16 miles east of Bloomfield, New Mexico and about 14.3 river miles downstream from Navajo Dam. The acequia parallels the San Juan River along the left (south) bank and is oriented in a southwestern direction (Figure 1). For the purposes of this EA, the river will be referred to as an east-west

orientation with banks being on the north and south.

The USACE proposes to: 1) replace the existing heading structure with a gated heading; 2) install 1,200 linear feet of 36-inch reinforced concrete pipe; and 3) place wire-wrapped rip-rap along 103 feet of the embankment. The main objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members. Project construction would be scheduled during the non-irrigation season with an expected duration of about four months.

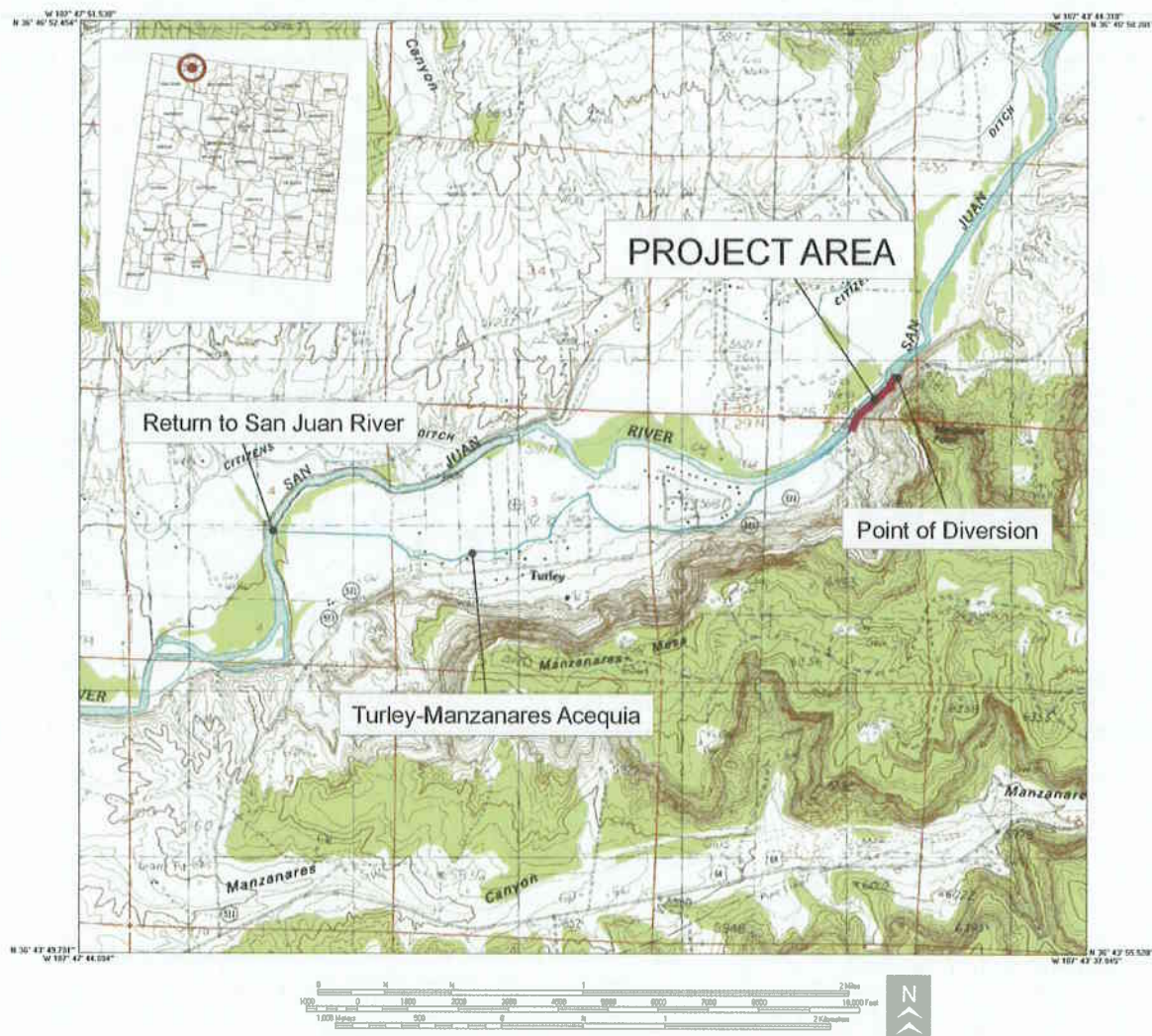
1.2 Purpose and Need

The Turley-Manzanares acequia is in need of rehabilitation because the existing system for delivering water is difficult and costly to operate and maintain. According to a USACE reconnaissance report prepared for this project (U.S. Army Corps of Engineers, 2002), high flows have eroded the berm that separates the acequia inlet channel from the San Juan River. The berm has been overtopped by high flows and some of its rock armoring has been washed away (Figure 2).

The existing acequia facilities consists of a diversion groin that extends approximately one-third of the way across the river channel. It is composed of boulders and concrete rubble (Figure 2A). The diversion groin directs flow into the inlet channel to the ditch heading structure and sluice (Figure 2B). An open ditch conveys water from the heading structure to downstream agricultural fields. The ditch is about eight feet wide and is separated from the river channel by a narrow berm (Figure 2C).



Figure 1. Location of the proposed project area on the San Juan River near the village of Turley in northeastern San Juan County, New Mexico. The existing diversion is located in the SE 1/4 of Section 35, T. 30 N., R. 9 W., N.M.P.M.; at 36° 45.778' North latitude, 107° 44.516' West longitude; and in UTM Zone 13 at 255244.4 meters Easting, 4071882.3 meters Northing, North American Datum of 1927. Map consists of portions of the Archuleta, New Mexico (provisional edition 1985, no. 36107-G6-TF-024) and Turley, New Mexico (provisional edition 1985, no. 36107-G7-TF-024) 7.5-Minute U.S.G.S. quadrangles.



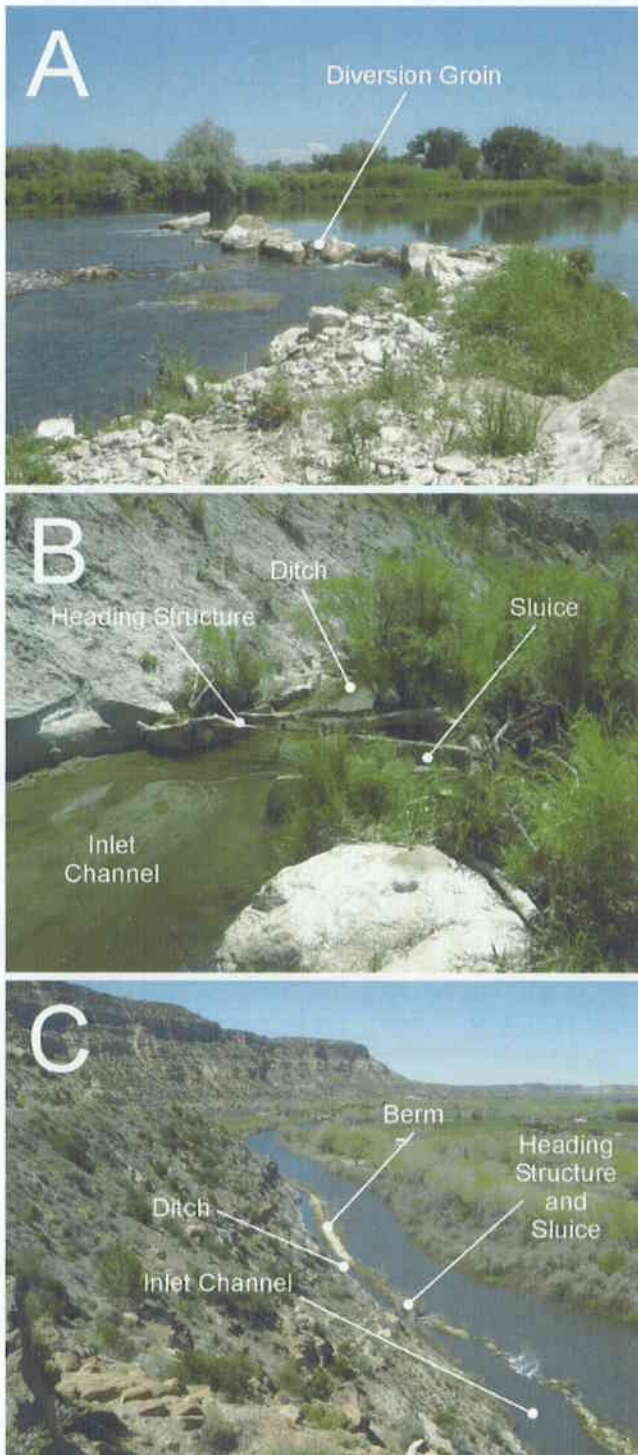


Figure 2. Important features of the Turley-Manzanares acequia in the project area.

A. View upstream of the boulder and concrete rubble diversion groin at a discharge of 536 cfs on 12 July 2005 (as measured at the U.S. Geological Survey stream gage number 0935500 at Archuleta).

B. View downstream of the heading structure and sluice at a discharge of 536 cfs on 12 July 2005.

C. View downstream of the inlet channel, heading structure, and ditch at a discharge of 3,290 cfs on 12 May 2005. Note overtopping of the inlet channel berm in the lower right portion of the photo.



Because the heading structure does not adequately control flow into the ditch, water overtops the ditch during high flows and washes out the berm. Large amount of debris are diverted into the inlet channel along with water and the debris builds up against the heading structure and sluice. In addition, erosion on the adjacent hill slope to the south results in substantial amounts of sediment deposition in the ditch. This results in changes in the slope of the ditch channel and reduces the capacity of the ditch to convey water to downstream agricultural fields.

These problems have resulted in acequia maintenance in the project area to require occasional placement of rock at the diversion groin and on the embankment at breach points, dredging of the ditch, and removal of trash at the heading structure and sluice. These maintenance activities are typically conducted on an annual basis and involve operation of construction equipment along the approximately 1,200-foot length of the embankment from the diversion groin downstream.

The primary objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members by correcting the current problems. A secondary benefit of the proposed project would be to reduce maintenance costs for the Ditch Association.

1.3 Regulatory Compliance

This EA was prepared by Blue Earth Ecological Consultants, Inc., for the USACE, in compliance with all applicable federal statutes, regulations and executive orders (EO) including, but not limited to the following:

- National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321 et seq.)
- Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508);
- U.S. Army Corps of Engineers Procedures for Implementing NEPA (33 CFR 230, ER 200-2-2);
- Clean Air Act of 1972 (42 U.S.C. 7401-7671, as amended);
- Clean Water Act (CWA) of 1977 (33 U.S.C. 1251 et seq.);
- Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544, as amended);
- Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 et seq., as amended);
- Farmland Protection Policy Act, 1981 (7 U.S.C. 4201, as amended);
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470);
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-3013);
- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996);
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470);
- Protection of Historic and Cultural Properties (36 CFR 800 et seq.);
- EO 11514, Protection and Enhancement of Environment Quality;
- EO 11988, Floodplain Management;
- EO 11990, Protection of Wetlands;
- EO 12898, Environmental Justice;
- EO 13007, Indian Sacred Sites;
- EO 13084, Consultation and Coordination with Indian Tribal Governments; and
- EO 11593, Protection and Enhancement of the Cultural Environment.



1.4 Scoping Summary and Key Issues

Project scoping letters were sent on 31 May 2005 to eight federal and state government agencies, six tribal governments, and the Turley-Manzanares Community Ditch Association. A complete list of those receiving the scoping letter, along with responses, is contained in Appendix A. Four responses were received, including responses from the U.S. Fish and Wildlife Service and New Mexico Department of Game and Fish. Both agencies provided lists of special status species which may occur in the project area.

The Department of Game and Fish had several project-specific comments, including concerns over construction impacts, use and maintenance (or lack thereof) of gabion baskets, concern for protection of water quality and listed fish species, fish passage during construction and operation of the diversion, potential cumulative effects of multiple diversion rehabilitation projects on the San Juan River, and the need for mitigation for impacts to wetland and riparian habitats. The New Mexico Department of Game and Fish also suggested investigating the potential to move the point of diversion downstream past the bluff on the south side of the existing diversion and heading structure.

The U.S. Fish and Wildlife Service provided a list of federal listed, proposed, and candidate species that may occur in San Juan County; no project-specific comments were provided. Other responses to the scoping letter were from the Turley-Manzanares Community Ditch Association and the Pueblo of Laguna. The Pueblo of Laguna determined that the proposed project would not affect any traditional religious or cultural properties or sites. The Ditch Association reiterated their need for rehabilitation of the diversion.



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2.0 DESCRIPTION OF ALTERNATIVES AND PROPOSED ACTION

2.1 Alternatives Eliminated from Detailed Study

An alternative involving construction of an inflatable spillway system was initially considered in the USACE reconnaissance report. The inflatable spillway system would consist of an inflatable bladder dam attached to a concrete weir. The bladder would be inflated or deflated to regulate the amount of water diverted to the heading structure. A concrete split weir would be constructed that would span the entire river channel at the location of the existing diversion groin. One portion of the split weir (*ca.* 53 feet) would be constructed at a fixed elevation and the other portion (*ca.* 80 feet) would house the inflatable spillway gate. Construction of the split weir and inflatable spillway system would involve use of construction equipment and staging areas on both the north and south sides of the river.

The inflatable spillway system alternative would also involve construction of a trash rack installed parallel to stream flow at the inlet channel, construction of a concrete-capped gabion heading structure with a slide gate and sluice, installation of 1,200 linear feet of buried, reinforced concrete pipe, and placement of 1,200 linear feet of wire-wrapped rip-rap along the embankment for the length of the buried pipe.

The split weir of the inflatable spillway system would create a barrier to upstream fish movement in the San Juan River. It would also negatively affect boating in the river by creating an obstacle that would require portaging around. Impacts

associated with in-channel construction would negatively affect water quality and the fish community in the project area. Furthermore, the structure would change habitat conditions in the project area that would be detrimental. These environmental impacts would be unacceptable and would require substantial mitigation. Finally, the cost of the inflatable spillway system is substantially higher than the proposed action (\$1.8 million vs. \$1.1 million). Due to unacceptable environmental effects and cost, this alternative was eliminated from further analysis.

2.2 Alternatives Considered in Detail

2.2.1 No Action

The no action alternative would consist of no improvements to the existing diversion facilities. The existing diversion groin, inlet channel, heading structure and sluice, ditch, and berm would continue to function and be maintained as they have in the recent past. Typical maintenance in the project area - placement of rock at breach points, dredging of the ditch, and removal of trash - would continue.

2.1.2 Proposed Action

The proposed action would involve construction of a gated heading structure and installation of 1,200 linear feet of 36-inch elliptical reinforced concrete pipe. Approximately 80 linear feet (*ca.* 987 cubic yards) of dumped rip-rap would be placed at the existing diversion groin location to



create a guide weir that would direct stream flow to the inlet channel.

Construction of the guide weir would involve placing rip-rap material (*i.e.* angular rock with a mean diameter of 24 inches) at the existing diversion groin location. The existing material would be left in place. The new guide weir would have a top elevation two feet below the bank elevation, which would allow for overtopping at high flows, similar to the existing diversion groin. Top elevation of the existing diversion groin ranges from 96.79 ft to 99.45 ft (site elevation). Top elevation of the proposed new guide weir would be 97.00 ft (site elevation). The new guide weir would also be permeable to base flows, as there would be voids in the rock fill (*ca.* 4 to 5 inches) that would allow some water to flow through.

The inlet channel area would be protected by a trash rack installed parallel to stream flow, which would serve to catch debris and keep it from collecting at the heading structure. A new heading structure would be constructed from concrete capped gabions. The top elevation of the gabions would match the top height of the bank. The heading structure would be fitted with a slide gate at the ditch inlet and a sluice gate to allow for regulation of the amount of water diverted into the concrete pipe.

The reinforced concrete pipe would be placed along the existing ditch alignment from the heading structure downstream for a distance of 1,200 feet. The pipe would be covered with soil. Approximately 103 linear feet of wire-wrapped rip-rap would armor the embankment on the downstream side of the guide weir. The proposed action would involve use of construction equipment and staging areas only on the south side of the river.

2.3 Environmental Protection

- Construction-related effects to air quality would be minimized by: 1) requiring the contractor to have emission control devices on all equipment; and 2) employing the use of Best Management Practices to control wind erosion, including wetting of soils within the construction zone and compliance with local soil sedimentation and erosion-control regulations. Construction and operation would conform with air quality control regulations as established by the Clean Air Act and the New Mexico Air Quality Control Act.
- To reduce temporary construction noise, construction contracts would require that construction equipment and activities comply with state and local noise control ordinances.
- To protect water quality and comply with New Mexico water quality standards, all fill material placed in the San Juan River would be free of fines to minimize turbidity caused by rehabilitation of the diversion guide weir and construction of the new diversion heading. If flows are reduced below 500 cfs during construction, turbidity would be monitored above and below the work area to ensure that the water quality standard for turbidity is not exceeded. If turbidity monitoring indicates that the 10 NTU threshold is being approached, construction activities immediately ceased or altered to avoid exceeding the turbidity threshold.
- Compensation for the loss of 1,290 ft² (0.03 acres) of wetlands caused by the proposed action would consist of on-site restoration and enhancement of wetlands along the river side



of the embankment downstream from the wire-wrapped rip-rap. Restoration and enhancement would entail planting coyote willow cuttings along the bank at an appropriate elevation to ensure adequate moisture in the rooting zone.

- Impacts to riparian habitat would be avoided or reduced by implementing the following measures. Coyote willow cuttings and cottonwood poles would be planted on the river bank along the length of the embankment in the project area (*ca.* 1,070 ft). This would be conducted in conjunction with mitigation for wetland impacts. Coyote willow cuttings and cottonwood poles would be planted at an appropriate elevation to ensure adequate moisture in the rooting zone. This would compensate in part for loss of riparian habitat and also restore overhanging vegetation cover for aquatic habitat along the bank. Construction fencing would be placed around the large cottonwood trees at the picnic site to prevent soil compaction in their effective root zones. Fencing would be placed at or beyond the canopy drip lines of the individuals trees.
- The following measure would be implemented to minimize direct disturbance of Bald Eagles during project construction activities that take place from February through March. If a Bald Eagle is present within 0.25 miles of an active construction site in the morning before construction activity starts or is present following breaks in project activity, the project contractor would be required to suspend all activity until the bird leaves of its own volition or until a USACE biologist, in consultation with the U.S. Fish and Wildlife Service, determines that the potential for harassment is minimal. However, if a Bald Eagle arrives during construction activities or if an eagle is greater than 0.25 miles away, construction need not be interrupted. If Bald Eagles are consistently found in the immediate project area during the construction period, the U.S. Fish and Wildlife Service would be contacted to determine whether formal consultation under the Endangered Species Act is necessary.



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3.0 EXISTING ENVIRONMENT AND FORESEEABLE EFFECTS OF THE PROPOSED ACTION

3.1 Physical Resources

3.1.1 Physiography and Climate

3.1.1.1 Existing Conditions

The project area is located in the canyon of the San Juan River about 14.3 river-miles downstream from Navajo Dam. The heading and ditch are situated at the base of the steep slope of Melquiadis Point on the south side of the river. The opposite side of the river is bounded by a broad, level floodplain that yields on its north side to low, rolling hills (Figure 3).

The project area has a mid-latitude desert climate, with an annual average precipitation amount of 12.9 inches (Western Regional Climate Center, 2005). Precipitation is irregular, but there is typically a pattern of monsoonal rains in July and August as Gulf air masses penetrate into the region (Figure 4). Cyclonic precipitation occurs during winter months, with average annual snowfall in the area of about 11.8 inches. Average diurnal temperature fluctuations of 20°F to 30°F are characteristic of the project area. Summer temperatures are warm and winters are relatively mild (Figure 4).

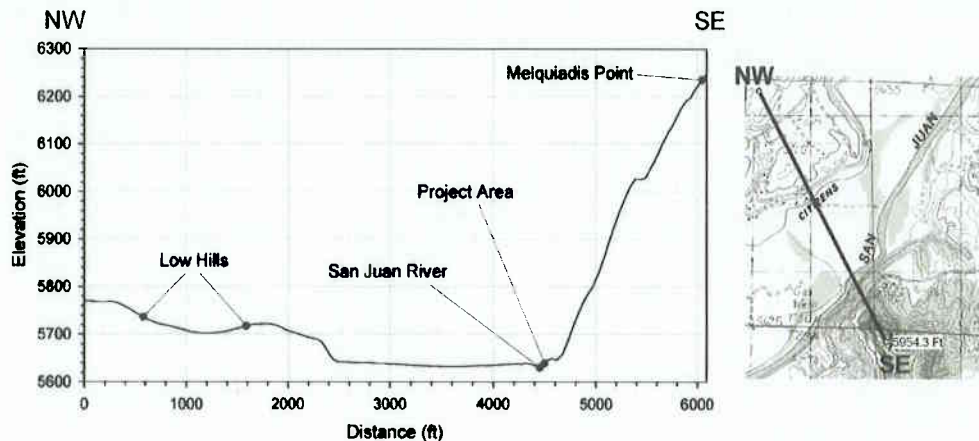


Figure 3.
Elevation
profile through
the project area.

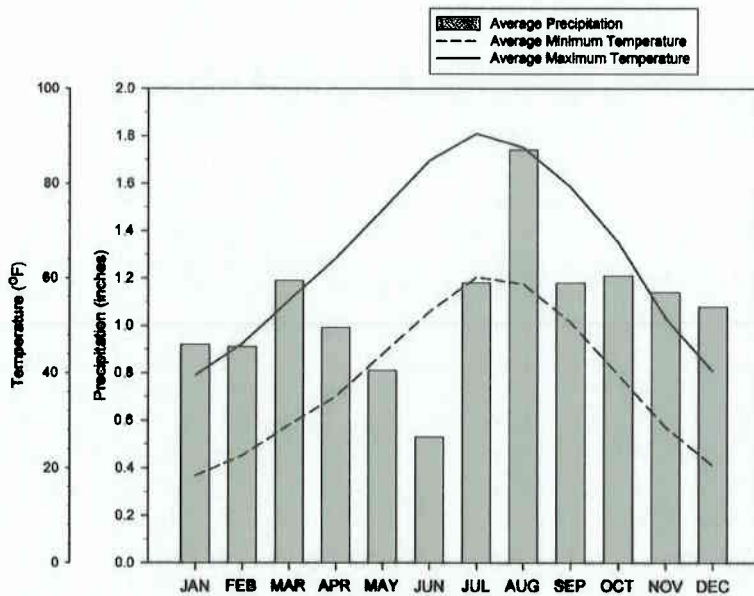


Figure 4. Precipitation and temperature characteristics in the project area.

3.1.1.2 Effects on Physiography and Climate

Neither the no action alternative or proposed action would change physiographic characteristics of the project area or climatic conditions.

3.1.2 Geology and Soils

3.1.2.1 Existing Conditions

The project area is located in the San Juan Basin of the Colorado Plateau physiographic province (Woodward *et al.*, 1997). The San Juan Basin began to form in Tertiary time (*ca.* 65 million years ago) by subsidence and uplift of surrounding mountains. Sediments eroded from the uplifting mountain masses filled the basin. These sediment strata are visible in the walls of the canyon cut by the San Juan River (McLemore, 2003). The rock strata in the canyon walls have a fluvial origin and

consists of conglomerates, sandstone, and shale. The project area is situated in Holocene (*i.e.* within the last 12,000 years) alluvium deposited by the San Juan River. This alluvium ranges from coarse sand to gravel and also includes imported fills associated with construction and maintenance of the existing diversion.

Upland soils in the project area are Walrees Series and are generally described as moderately deep and poorly drained (Keetch, 1980). These soils are formed in alluvium derived from mixed sources. The surface layer is a grayish brown loam. Permeability is moderately slow to a depth of 30 inches and very rapid below this depth (Keetch, 1980).

3.1.2.2 Effects on Geology and Soils

No Action Geology and soil conditions in the project area would not change with the no action alternative. Continuing maintenance of the



existing facility would likely include periodic placement of fill along the river-side embankment of the ditch to repair eroded areas. Ongoing repair and maintenance activities could affect the river-side embankment along the upstream two-thirds of its length where breaching has occurred in the past. The area likely subject to soil disturbance from placement of fill for ongoing routine maintenance and access to breached areas is about 0.34 acres. Placement of large-diameter fill material (e.g. boulders, chunks of concrete) to maintain the existing diversion groin would also likely continue, which would result in mechanical disturbance of soils along the top of the berm from operation of equipment.

These ongoing maintenance actions contribute to existing soil conditions in the project area. Consequently, they would not change the existing soil and geologic conditions in the project area.

Proposed Action Geology in the project area would not change with implementation of the proposed action. The proposed action would include placement of soil to fill the existing ditch, bed the pipe, and level the ground surface of the filled area at a local elevation of 101 ft. The resulting fill would cover about 1.62 acres and would be similar in composition to existing soils (i.e. gravels and coarse sand).

About 85 percent of the fill area would constitute new 'soils' in the project area resulting from fill of the open ditch. The remaining 15 percent of the fill area would constitute covering of existing soils along and on top of the embankment.

Fill material placed in the project area would be devoid of vegetation, at least in the short term. Maintenance of a cleared equipment access path to the heading structure, similar to the existing condition, would continue with the proposed

action. Fill would also be subject to erosion, particularly fill placed on the side slope of the embankment.

Past and ongoing actions have created the existing soil conditions in the project area. These actions have consisted primarily of disturbance of surface soils and placement of fill to repair breaches in the embankment. The appropriate area of analysis for cumulative effects is the project area because effects of the proposed action on soils will diminish markedly outside of this area. There are no known future actions other than the proposed action that may affect soils in the project area.

The proposed action would not overlap in time or space with past and ongoing maintenance actions that affect soil in the project area. This is because effects of the past and ongoing actions would cease with implementation of the proposed action. The maintenance actions that resulted in surface disturbance and placement of fill would be supplanted by placement of fill and surface disturbance associated with the proposed action (i.e. the effects would not accumulate).

3.1.3 Water Resources

3.1.3.1 Existing Conditions

Designated uses of the San Juan River in the project area include high quality cold-water fishery, irrigation, livestock watering, wildlife habitat, municipal and industrial water supply, and secondary contact recreation (New Mexico Administrative Code §20.6.4.405). Water quality standards specified for the reach include:

- conductivity shall not exceed 400 $\mu\text{mhos/cm}$ at 77°F;
- pH shall be within the range of 6.6 to 8.8;



- temperature shall not exceed 68°F; and
- turbidity shall not exceed 10 nephelometric turbidity units (NTU).

Additionally, use-specific water quality criteria specified at New Mexico Administrative Code §20.6.4.900 are applicable to the reach. These use-specific standards include a minimum dissolved oxygen concentration of 6.0 mg/L, criteria for acute and chronic toxicity to aquatic life, and numeric standards for various substances.

Attainment of designated uses in the San Juan River in the project area was assessed in 2004 (New Mexico Water Quality Control Commission, 2004: 298). The assessment concluded that all designated uses except high quality cold-water fishery were being fully supported. The high quality cold-water fishery use was not supported below the Hammond Diversion Dam due to mercury concentrations in fish tissue. The Hammond Diversion Dam is located downstream from the project area. Total maximum daily loads for the mercury-related water quality impairment are scheduled to be developed in 2017 (New Mexico Water Quality Control Commission, 2004: 298).

The segment of the San Juan River downstream from the project area is impaired and does not support the marginal cold-water fishery designated use due, in part, to sedimentation and siltation (New Mexico Water Quality Control Commission, 2004: 297). A total maximum daily load for sedimentation in the reach of the San Juan River from the Animas River upstream to Cañon Largo was established in 2004 (New Mexico Surface Water Quality Bureau, 2004). This total maximum daily load for sedimentation is 29.5 percent fines in the stream substrate, while the current measured load is 52 percent fines in the stream substrate (New Mexico Surface Water

Quality Bureau, 2004). Cañon Largo is the first major sediment supply source for the San Juan River below Navajo Dam (Bliesner and Lamarra, 1999).

Turbidity in the San Juan River varies with stream flow, as indicated by data collected in 2002 by the New Mexico Environment Department - Surface Water Quality Bureau. Turbidity in the San Juan River at Blanco ranged from 1.5 to 12.0 NTU between 22 May and 21 October 2002 ($n = 7$; U.S. Environmental Protection Agency, 2006). Mean daily discharge on days of turbidity measurement ranged from 518 to 824 cubic feet per second (cfs), as measured at the U.S.G.S. gage at Archuleta. The relationship between the turbidity measurements and associated mean daily discharge was best described by a second-order regression (Figure 5). This regression equation explained 83 percent of the variation in the relationship between turbidity and stream flow.

Average daily discharge of the San Juan River in the project area varies from base flows of about 600 cfs to a peak flows of about 2,400 cfs (Figure 6). Base flow conditions occur from around the end of August through the end of February. Flows become much more variable downstream from the project area due to the influence of tributary inputs and diversion withdrawals (Figure 6). The amount of water withdrawn from the San Juan River at the Turley-Manzanares Diversion is currently not quantified. Water is diverted from the San Juan River and conveyed through approximately 16,500 linear feet of ditch to irrigated agricultural fields before returning to the San Juan River (Figure 1).

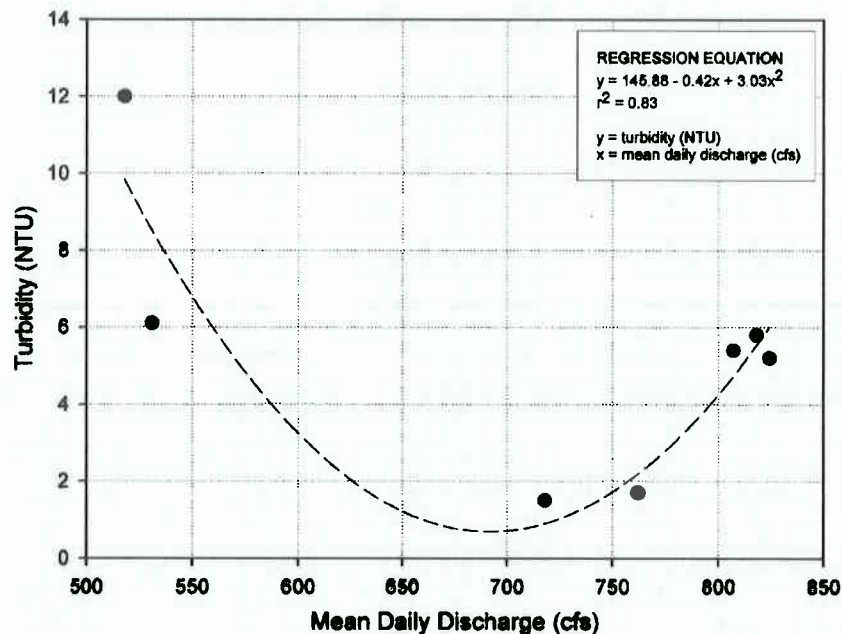


Figure 5. Relationship between turbidity and stream flow in the project area. Turbidity measurements were taken by the New Mexico Environment Department - Surface Water Quality Bureau in 2002 at Blanco, located about 12 miles downstream from the diversion (U.S. Environmental Protection Agency, 2006). Mean daily discharge measurements are from the U.S.G.S. gage at Archuleta.

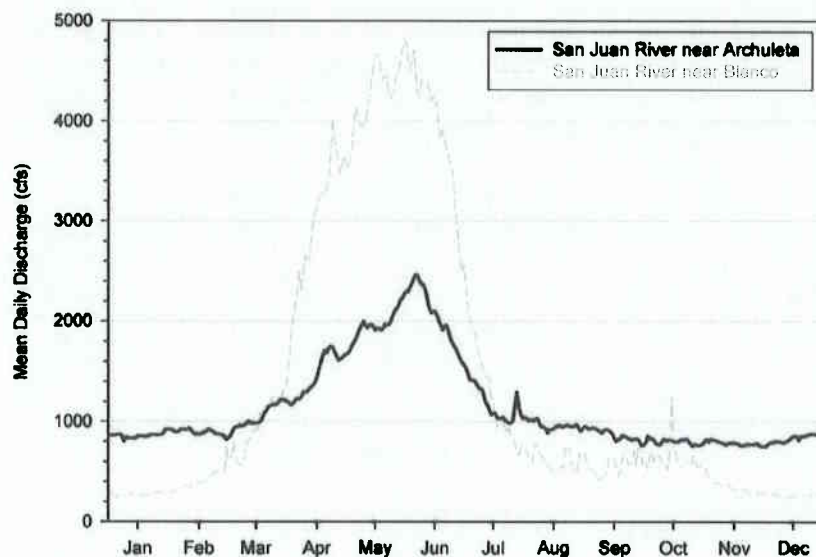


Figure 6. Average annual daily flow in the San Juan River near Archuleta, 1955 through 2004. Average annual daily flow at Blanco, downstream from the project area and below the confluence of Cañon Largo, is also shown.

3.1.3.2 Effects on



Water Resources

No Action Operation of the existing diversion facility would continue to have minimal impacts on water quality caused by depletion of flows from the river and altered water quality of irrigation return flows. Existing patterns of water withdrawal and occasional short-term increases in turbidity and suspended sediments related to maintenance of the diversion facilities would continue with the no action alternative.

Proposed Action Water resources would be impacted by proposed rehabilitation of the existing diversion. Operation of the diversion would not have any additional impacts above those that occur with the existing facility. Rehabilitation of the guide weir and construction of a new ditch heading would cause short-term increases in turbidity and suspended sediments from placement of rock fill, operation of construction equipment to place the rock, and construction of the concrete-capped gabion heading structure. These activities would disturb about 5,487 ft² of stream bottom, with 97 percent of the disturbance occurring at the diversion groin.

The quantity of sediment generated from the disturbed stream bottom area would be a function of the amount of fine sediment in the substrate. In 2004, the percentage of particles less than 0.08 inches diameter in the substrate of the San Juan River was about 10 percent at the confluence of Pump Canyon, which is located about 1.6 miles upstream from the project area (New Mexico Environment Department, 2005: 37). Based on qualitative observations made in the field, about 30 percent of the fine sediments in the stream substrate were particles that could be suspended and contribute to turbidity (*i.e.* very fine silt and clay particles).

If it is assumed that the top four inches of substrate are disturbed, then a total volume of about 24 yd³ of fine sediment could potentially be suspended in surface water of the San Juan River. Furthermore, if it is assumed that only about 10 percent of the affected area would be disturbed at any one time, then a maximum volume of about 2.4 yd³ of fine sediments could potentially be suspended at any one time during the course of the project.

The effect of in-stream disturbances on turbidity levels varies with the severity of the disturbance (*e.g.* open-cut pipeline trenching *vs.* rip-rap placement along stream bank) and the flow regime of the river or stream (Cline *et al.*, 1982; Reed, 1980). As an example, in-stream excavation and diversion activities associated with large-scale construction caused a 50 to 100 percent increase in turbidity levels in Yellow Creek, a stream located in northeast Mississippi (Shields and Sanders, 1986). This would represent a worst-case scenario for the proposed alternative, which involves actions that have a much smaller area of impact and severity of channel disturbance and would likely generate much lower levels of turbidity and suspended sediments (*e.g.* Sample *et al.*, 1998).

Under the worst-case scenario, it is assumed that rehabilitation of the guide weir and construction of the diversion heading would result in a 100 percent increase in turbidity levels. This increase would result in turbidity levels below the 10 NTU water quality standard if flows are between about 500 and 800 cfs (Figure 5). Construction would be conducted in the winter months, which would satisfy these flow criteria.

Elevated turbidity levels caused by the proposed action would likely occur during construction and would not persist following completion of the



project, as has been found in other studies (Cline *et al.*, 1982; Tsui and McCart, 1981). These studies found little to no residual sedimentation or turbidity effects in mountain streams following completion of highway construction.

The appropriate area for cumulative effects analysis for water resources is the San Juan River from the diversion downstream for a distance of about 0.5 miles. The effects of the proposed action would be insignificant beyond this point. The effect of past and ongoing actions on water quality in the project area are represented by the existing conditions. Future actions that may impact water resources and that would overlap spatially or temporally with the proposed action include potential re-operation of Navajo Dam by the Bureau of Reclamation to assist in the recovery of two endangered fish species. This project may reduce summer base flows by reducing releases from Navajo Dam (Bureau of Reclamation, 2002).

Short-term turbidity increases caused by the proposed action would cumulatively add to the effects of potentially-reduced base flows in the project area. Dilution of sediments put into suspension by construction activities would be lessened at reduced flows, resulting in increased concentrations. The preferred alternative for operation of Navajo Dam would set a minimum flow of 250 cfs below Navajo Dam, with an average flow in July of 385 cfs and an average flow in January of 300 cfs (Bureau of Reclamation, 2002). If construction occurred during flows lower than about 500 cfs, the 10 NTU turbidity standard could be exceeded. However, elevated turbidity levels would persist for several days at most and in a relatively short reach of the river downstream from the diversion groin, probably no more than about 500 m (1,640 ft; *cf.* Cline *et al.*, 1983).

Mitigation All fill material placed in the San Juan River would be free of fines to minimize turbidity caused by rehabilitation of the diversion guide weir and construction of the new diversion heading. If flows are reduced below 500 cfs during construction, turbidity would be monitored above and below the work area to ensure that the water quality standard for turbidity is not exceeded. If turbidity monitoring indicates that the 10 NTU threshold is being approached, construction activities would be immediately ceased or altered to avoid exceeding the turbidity threshold.

3.1.4 Floodplains and Wetlands

3.1.4.1 Existing Conditions All of the project area, with the exception of the proposed equipment and material staging area, is within the floodplain of the San Juan River. The project area within the floodplain comprises about 23 acres.

A routine jurisdictional wetland determination and delineation of the project area was conducted on 12 July 2005 pursuant to the 1987 Corps of Engineers Wetlands Delineation Manual procedure (Environmental Laboratory, 1987). Wetlands in the project area were restricted to a narrow marginal band along both the river and ditch sides of the embankment. The average width of the wetland band on the river side of the embankment was 3.1 ft ($n = 8$, min. = 0.3 ft, max. = 6.0 ft). Mean width of the wetland margin on the ditch side of the embankment was 0.8 ft ($n = 8$, min. = 0.2 ft, max. = 6.0 ft). The areal extent of wetlands in the project area was 4,650 ft² (0.11 acres), of which 79 percent was on the river side of the embankment (Figure 7).



Figure 7. Marginal wetland band along the embankment.

Dominant plant species of the marginal wetland band were coyote willow (*Salix exigua*), narrowleaf cattail (*Typha angustifolia*), Northwest Territory sedge (*Carex utriculata*), cocklebur (*Xanthium strumarium*), cottonwood (*Populus deltoides*), chairmaker's bulrush (*Schoenoplectus americanus*), marshy spike-rush (*Eleocharis palustris*), and field horsetail (*Equisetum arvense*). Soils in the marginal wetland band were saturated in the upper 6 inches and free water was encountered at a depth of 0.4 inches to 12 inches. Wetland soils had a silty-sand texture with a matrix color of 10 YR 4/4. Organic streaking (10 YR 2/1) was common and prominent in the soil profile.

The marginal wetland band along both sides of the embankment are impacted periodically by maintenance of the existing facility. Annual cleaning of the ditch disturbs marginal wetlands along the ditch banks (ca. 975 ft²) and maintains them in an early successional state. Similarly,

portions of the marginal wetland band along the river side of the embankment are periodically disturbed by repair of breaches in the embankment and maintenance of the diversion guide weir.

3.1.4.2 Effects on Floodplains and Wetlands

No Action Operation and maintenance of the existing facility would cause recurring impacts to wetlands along the embankment. On average, about 1,894 ft² (0.04 acres) of wetlands in the project area are disturbed by these activities on an annual basis. No encroachments on the floodplain would occur with continued operation and maintenance of the existing diversion facility.

Proposed Action The proposed action would fill the open ditch in the project area, effectively converting the ditch into floodplain land surface. This would represent an increase in floodplain



land surface in the project area of about 1.38 acres.

Conversion of the open ditch to a buried pipeline would result in filling of about 975 ft² of wetland on the ditch side of the embankment. Installation of wire-wrapped rip-rap on the river side of the embankment below the diversion weir would result in fill of another 315 ft² of wetland. Therefore, a total of about 1,290 ft² (0.03 acres) of wetlands would be filled by the proposed action.

The appropriate boundary for analysis of cumulative effects on wetlands and floodplain is the project area because the proposed action will not have any effects on these resources beyond the project area limits. Ongoing actions that are affecting wetlands in the project area would be supplanted by the proposed action and, therefore, would not accumulate. There are no known future actions that would affect wetlands or floodplain in the project area. Consequently, the proposed action would not result in cumulative effects on wetlands or floodplain.

Mitigation Compensation for the loss of 1,290 ft² (0.03 acres) of wetlands caused by the proposed action would occur. This compensatory mitigation would consist of on-site restoration and enhancement of wetlands along the river side of the embankment downstream from the wire-wrapped rip-rap. Restoration and enhancement would consist of planting coyote willow cuttings along the bank at an appropriate elevation to ensure adequate moisture in the rooting zone.

3.1.5 Air Quality

The Clean Air Act of 1970, as amended, established National Ambient Air Quality Standards for six criteria air pollutants: ozone,

airborne particulates, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. If measured concentrations of the six pollutants exceed their respective standards, the U.S. Environmental Protection Agency can designate the area as nonattainment area for that pollutant.

3.1.5.1 Existing Conditions

No exceedences of the National Ambient Air Quality Standards have been measured in the air quality monitoring network in San Juan County (New Mexico Environment Department, 2005). Therefore, the area is currently in attainment of all federal air quality standards.

3.1.5.2 Effects on Air Quality

No Action The no action alternative would not affect existing air quality as no changes would occur in regards to rehabilitation of the acequia.

Proposed Action The proposed project would result in minor, short-term effects to local air quality from heavy equipment emissions at the construction site. An increase in particulates would be expected as a result of topsoil disturbance, as would localized concentrations of carbon monoxide from equipment operation during construction. No long-term or cumulative effects to air quality are anticipated as a result of operation of the proposed facilities.

Mitigation Construction-related effects to air quality would be minimized by: 1) requiring the contractor to have emission control devices on all equipment; and 2) employing the use of Best Management Practices to control wind erosion, including wetting of soils within the construction zone and compliance with local soil sedimentation and erosion-control regulations. Construction and maintenance of the proposed project would



conform with air quality control regulations as established by the Clean Air Act and the New Mexico Air Quality Control Act.

3.1.6 Noise Levels

In considering potential effects of increased noise levels, sensitive noise receptors are identified in a project area. Sensitive receptors include but are not limited to homes, lodging facilities, hospitals, parks, and undeveloped natural areas.

3.1.6.1 Existing Conditions

The project area generally has a low level of noise as most of the area is undeveloped or agricultural lands. Natural sounds heard during the field survey in July 2005 include water flowing in the San Juan River, birds and insects, and wind rustling leaves of cottonwood trees and other plants. The primary sound of human habitation included light vehicle traffic traveling on N.M. Highway 551. Except for the occasional jarring sound of large trucks "jake-braking" on the downhill lane of the road, noise from vehicles on this highway was generally muffled by the terrain. U.S. Highway 64, about 1.8 miles south of the project area on the opposite side of Manzanares Mesa, contributed a consistent, soft "white noise" in the background.

One home is located on the north bank of the San Juan River at the west end of the project area, across the river from where the proposed pipeline would terminate and the acequia would once again become an open ditch. No other homes or other buildings that would be considered sensitive noise receptors are located in the project area. A small subdivision, Las Vegas de San Juan, consisting of several dozen homes is located along on the south side of the river downstream from the west project

terminus. Other sensitive noise receptors in the project area are wildlife and fish.

3.1.6.2 Effects on Noise Levels

No Action The no action alternative would not result in any construction in the project area. Therefore, there would be no effect on current noise levels.

Proposed Action If the proposed action is implemented, there would be temporary increases in noise levels from the operation of heavy equipment which would last approximately four months during day time hours. Noise from equipment operation would disrupt the relatively peaceful setting along the river currently enjoyed by adjacent landowners and their guests who utilize the area for recreation (e.g. fishing, picnicking, camping) and recreationists on the San Juan River (e.g. fishers). Wildlife that use this reach of the San Juan River may be temporarily displaced by the increased level of noise. Cumulative effects of noise increases were assessed using the an approximately one-mile radius from the project area, assuming that large equipment noise may be heard from that distance at times. The increase in noise generated by construction of the project would add to noise levels from vehicles on N.M. Highway 511 and U.S. Highway 64, resulting in a cumulative increase in noise levels during the period of construction.

Mitigation To reduce temporary construction noise, construction contracts would require that construction equipment and activities comply with state and local noise control ordinances.



3.2 Biological Resources

3.2.1 Terrestrial Habitat

A biological field survey of the project area was conducted on 12 May and 12 July 2005. The project area is situated in Great Basin Desert Scrub vegetation (Dick-Peddie, 1993: 129-130). Upland terrestrial habitat in the project area was limited to access roads and staging areas and was characterized by relatively low plant species diversity and relatively high levels of human disturbance.

Terrestrial habitats in the project area were represented throughout the surrounding landscape and similar terrestrial vegetation was common and widespread in the vicinity of the project area. Upland terrestrial habitat in the project area was characterized by a dominance of shrubs including big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), three-leaf sumac (*Rhus trilobata*), fourwing saltbush (*Atriplex canescens*), and soapweed yucca (*Yucca glauca*). Downy chess (*Bromus tectorum*) was a dominant grass along the 0.1 mile-long access road from the highway to the staging area.

3.2.1.2 Effects on Terrestrial Habitat

No Action The no action alternative would not result in any changes to terrestrial habitat conditions in the project area. Existing levels of disturbance from vehicle travel, equipment operation, and human activity associated with ditch maintenance and recreation use would continue.

Proposed Action Construction of diversion and ditch features for the proposed action would result in minor impacts to terrestrial vegetation at

the proposed staging site on the south side of the river. Staging of equipment and materials would result in temporary impacts to about 0.3 acres of terrestrial habitat characterized by low plant species diversity and sparse plant cover. Dominant plant species in the proposed staging area on the south side of the river included big sagebrush, rubber rabbitbrush, fourwing saltbush, and downy chess. Impacts to 0.3 acres of this terrestrial habitat would be temporary and vegetation of similar species composition and density would probably recover at the site naturally within a period of three to five years.

The appropriate area of analysis for cumulative impacts to terrestrial habitat is the project area. This is because the proposed action will not have any effects beyond these limits and therefore will have no potential spatial or temporal overlap with factors affecting terrestrial habitat beyond these limits. Past and ongoing actions that combine to create the existing conditions in the project area include unimproved road construction, recreation use, and livestock grazing. The cumulative effect of these actions are represented by the existing condition in the project area.

The proposed action will result in incremental, temporal loss of 0.3 acres of terrestrial habitat in the project area that will add to impacts from past and ongoing actions. This effect is likely to persist for up to five years. The cumulative effect on terrestrial habitat is not likely to result in any measurable changes in overall habitat quality, population persistence, or viability of any terrestrial wildlife species in the project area.



3.2.2 Riparian and Aquatic Habitat and Wildlife

3.2.2.1 Existing Conditions

There is about 0.47 acres of riparian habitat in the project area. This habitat is located on the embankment that separates the ditch from the San Juan River. Riparian habitat in the project area was characterized by dense stands of young coyote willow (*Salix exigua*) on top of the embankment and coyote willow, Russian olive (*Elaeagnus angustifolia*), and cottonwood along the river side bank of the embankment (Figure 8).

Other common plants in riparian habitat included sticky rabbitbrush (*Ericameria viscidiflora*), rubber rabbitbrush, inland saltgrass (*Distichlis spicata*), Indian hemp (*Apocynum cannabinum*), New Mexico olive (*Forestiera neomexicana*), white sweet clover (*Melilotus alba*), Virginia creeper (*Parthenocissus quinquefolia*), showy milkweed (*Asclepias speciosa*), tansy mustard (*Descurainia obtusa*), wild licorice (*Glycyrrhiza lepidota*), wild rose (*Rosa woodsii*), cocklebur (*Xanthium strumarium*), mullein (*Verbascum thapsus*), rabbitfootgrass (*Polypogon monspeliensis*), lady's thumb (*Polygonum persicaria*), foxtail barley (*Hordeum jubatum*), sow thistle (*Sochus asper*), western wheatgrass (*Pascopyrum smithii* var. *molle*), and downy chess (*Bromus tectorum*). Several patches of Canada thistle (*Cirsium arvense*), a noxious weed, were located on the northern end of the embankment. Salt cedar (*Tamarix chinensis*) was uncommon.



Figure 8. Riparian vegetation on the embankment between the ditch and the San Juan River. River is to the right of the person in the photograph and the ditch is to the left.



Most of the woody vegetation in the riparian area consisted of small-diameter plants (Table 1). Saplings of cottonwood and Russian olive were abundant. Of the seven cottonwood trees greater than 10 inches dbh, only two cottonwood were located on the embankment. The remaining five cottonwood trees were located in the picnic site at the west end of the project area.

Coyote willow was abundant in riparian habitat in the project area (Figure 8). Maximum stem density in willow stands was 8 to 10 stems/ft². Riparian vegetation on the top of the embankment between the ditch and the San Juan River has been cut every year or two with a brush-hog and coyote willow patches have been sprayed periodically with the herbicide 2,4-D (G. Gross, landowner, pers. comm., 12 July 2005). These actions appear to keep the riparian vegetation in an early seral stage.

Table 1. Trees, saplings, and shrubs located in the project area, by diameter class. Tabulation does not include coyote willow.

SPECIES	SIZE CLASS (diameter at breast height, inches)		
	0 - 6	6.1 - 10	>10
Russian olive	7	5	0
New Mexico olive	11	0	0
Cottonwood	19	4	7
TOTAL	37	9	7

Mammal species known to occur in the riparian habitat include mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*). Other rodent species and bat species are also likely to occur in

the project area. Twenty-four bird species were observed in the project area during the field surveys in May and July 2005 (Table 2). Only one of these species, Black Phoebe, was observed nesting in the project area.

There was about 3.33 surface acres of aquatic habitat in the San Juan River in the project area from the diversion guide weir downstream to the western limit of the work area during base flows of about 500 cfs. Most of this (62 percent) was relatively uniform run habitat (*cf.* Arend, 1999; Figure 9). Riffle habitat composed about 28 percent and glide habitat constituted the remaining 10 percent of aquatic habitat in the project area (Figure 10). The channel of the San Juan River in the project area is characterized by a cobble-dominated substrate with less than 10 percent fines (New Mexico Environment Department, 2005: 37).

Fish species collected in the San Juan River in the vicinity of the project area include rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), red shiner (*Cyprinella lutrensis*), common carp (*Cyprinus carpio*), fathead minnow (*Pimephales promelas*), speckled dace (*Rhinichthys osculus*), white sucker (*Catostomus commersoni*), flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*Catostomus discobolus*), plains killifish (*Fundulus zebrinus*), western mosquitofish (*Gambusia affinis*), and mottled sculpin (*Cottus bairdi*; New Mexico Department of Game and Fish - Fish Database; Sublette *et al.*, 1990). Of these 12 species only speckled dace, flannelmouth sucker, bluehead sucker, and mottled sculpin are native to the San Juan River drainage. The remaining eight species are introduced.

The project area is located downstream from the San Juan River quality trout-fishing reach. The



quality waters extend 4.4 miles downstream from Navajo Dam. Brown trout reproduce naturally in the San Juan River below Navajo Dam. Rainbow trout are stocked in the river by the New Mexico Department of Game and Fish.

The existing diversion groin extends about one-third of the way across the channel. The two-thirds of the channel width not affected by the diversion groin provides aquatic habitat connectivity and allows for unimpeded up- and downstream movement of fish and other aquatic biota at the site.

Table 2. Bird species observed in the project area during the field surveys conducted on 12 May and 12 July 2005.

Common Name	Scientific Name
Great Blue Heron	<i>Ardea herodias</i>
Mallard	<i>Anas platyrhynchos</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Mourning Dove	<i>Zenaida macroura</i>
Western Wood-pewee	<i>Contopus sordidulus</i>
Black Phoebe	<i>Sayornis nigricans</i>
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Western Kingbird	<i>Tyrannus verticalis</i>
Black-billed Magpie	<i>Pica hudsonia</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Cliff Swallow	<i>Petrochelidon pyrrhonata</i>
Black-capped Chickadee	<i>Poecile atricapilla</i>
Bushtit	<i>Psaltirparus minimus</i>
White-breasted Nuthatch	<i>Sitta carolinensis</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Yellow Warbler	<i>Dendroica petechia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Yellow-breasted Chat	<i>Icteria virens</i>
Western Tanager	<i>Piranga ludoviciana</i>
Lazuli Bunting	<i>Passerina amoena</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
House Finch	<i>Carpodacus mexicanus</i>
Lesser Goldfinch	<i>Carduelis psaltria</i>



Figure 9. Aquatic habitat in the downstream two-thirds of the project area.

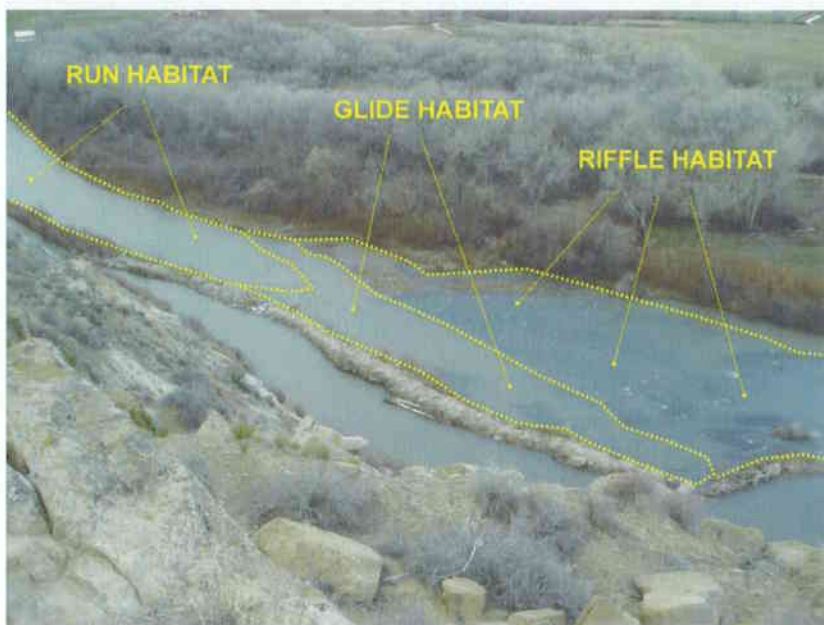


Figure 10. Aquatic habitat in the upstream one-third of the project area.



3.2.2.2 Effects on Riparian and Aquatic Habitat and Wildlife

No Action About 53 percent (0.22 acres) of the riparian habitat in the project area would be subject to recurring impacts from ditch cleaning, brush-hogging, herbicide application, embankment repair, and equipment operation on the embankment with the no action alternative. The few mature trees in the riparian habitat would persist, but the remaining shrub-dominated habitat would continue to be subject to regular disturbance and would be maintained in an early seral stage. Weed species, such as Canada thistle and salt cedar, would likely continue to expand their distribution and increase in abundance under the recurring disturbance regime with the no action alternative.

Aquatic habitat would be periodically impacted by maintenance of the diversion groin. This maintenance likely results in disturbance of a maximum of about 2,000 ft² of substrate. This disturbance likely causes short-term increases in turbidity and suspended sediments as well as incidental mortality of aquatic invertebrates and some individuals of small benthic fish species including speckled dace and mottled sculpin. However, these impacts are probably inconsequential due to their short duration and relatively small area of effect.

The extent of entrainment of fishes into the *acequia* by the existing diversion is unknown, but was identified by the New Mexico Department of Game and Fish as an issue (Appendix A). Small fish (probably fathead minnow and juvenile suckers) were noted in the ditch inlet area during the field survey.

Proposed Action The proposed action would remove the 0.42 acres of riparian vegetation on

the embankment between the ditch and the river. This would include two large cottonwood trees, one with a dbh of 14.3 inches and the other with a dbh of 24.1 inches. All of the New Mexico olive (11) and cottonwood saplings (23) would also be eliminated. Assuming an average coyote willow density of 1 stems/ft², an estimated 18,190 coyote willow stems would be removed by the proposed action. The four large cottonwood trees at the picnic area may be adversely affected by soil compaction from equipment operation.

About 0.41 acres of low-velocity aquatic habitat in the open ditch would be eliminated by placing the ditch in a buried pipe. About 0.13 acres (5,487 ft²) of stream substrate in riffle habitat would be disturbed by construction of the new ditch heading and guide weir. The effect of this substrate disturbance would be short-term increases in turbidity and suspended sediment, as described in section 3.1.3.2, as well as incidental mortality of aquatic macroinvertebrates and some individuals of small benthic fish species, such as speckled dace and mottled sculpin.

Increased turbidity reduces the reactive distance of trout to prey items, thereby reducing the encounter rate with prey which results in increased energy expenditure by individual foraging trout (Barret *et al.*, 1992; Sweka and Hartman, 2001). Elevated turbidity levels over an extended period of time may result in reduced growth rates compared to clear-water habitats (Sigler *et al.*, 1984). Proposed work on the guide weir is expected to last for up to about one month. Sporadic elevation of turbidity levels over this one-month period would not be expected to result in measurable effects on trout growth or abundance in the project area.

Although most reproduction of brown trout in the San Juan River occurs in the first four to five



miles below Navajo Dam, it is possible that some spawning of brown trout may occur in the project area. As described in section 3.1.3.2, a total of about 24 yd³ of fine sediment may be suspended in the San Juan River in the project area over the course of construction. Construction would occur during the winter months, coincident with the period of brown trout spawning and egg incubation. Suspension of fine sediments and subsequent deposition of those sediments downstream could potentially blanket and smother eggs of brown trout if any spawning redds are located downstream from the project area. However, deposition of fine sediments would likely be concentrated in low-velocity habitats, which are typically not habitats where spawning redds are located (Sublette *et al.*, 1990: 69). In summary, while there may be an adverse effect on brown trout spawning in the project area, the limited occurrence of spawning and the small quantity of fine sediment suspended relative to stream flow indicate that the effect would be insignificant.

About 14 percent of the available riffle habitat in the project area would be directly impacted by placement of fill. Following placement of fill, habitat quality at the guide weir would be equivalent to habitat conditions at the existing diversion groin in terms of substrate, water depth, and current velocity conditions. The proportion and areal extent of the three aquatic habitat types in the project area would not change with implementation of the proposed action. Similarly, up- and downstream movement of fish and other aquatic biota would continue to be unimpeded at the diversion site. The new guide weir would extend across one-third of the channel width, as does the existing diversion groin. The new guide weir would have a top elevation equivalent to the existing diversion groin and would be porous to stream flow (*cf.* section 1.2). Patterns of current

velocity and water depth at and around the new guide weir would be equivalent to existing conditions. Consequently, fish passage conditions at the diversion would not change with the proposed action.

Aquatic habitat along the embankment would be adversely affected by removal of overhanging vegetation cover, composed mainly of coyote willow. This overhanging vegetation provides shade, terrestrial invertebrate prey items, and leaf litter that contributes to the aquatic food web. Approximately 1,070 ft of near-bank habitat would be affected by removal of overhanging vegetation.

The potential for entrainment of fish into the *acequia* by the diversion structure would be similar to existing conditions. As noted above, the extent of fish entrainment by the existing structure is not known.

The appropriate area of analysis for cumulative effects to riparian and aquatic habitats and biota is the project area boundary because effects of the proposed action on these resources diminish rapidly beyond these limits. The existing conditions in the project area represent the cumulative impacts of past and ongoing actions on riparian and aquatic habitats and biota in the project area.

The proposed action would have a short-term (*i.e.* a period of no more than one month) temporal and spatial overlap with past and ongoing impacts on aquatic habitat. There would be no ecologically meaningful residual impact from the proposed action on aquatic habitat. Impacts to aquatic habitat may overlap temporally with potential re-operation of Navajo Dam, which in turn may cause lower base flows in the project area. As described in section 3.1.3.2, the cumulative effects



of these actions may include increased turbidity in the project area for short periods of time.

The proposed action would result in cumulative impacts to riparian vegetation, when added to effects of past and ongoing actions. These effects would not exceed any ecologically meaningful thresholds for population persistence or viability of any wildlife species, due to the relatively small area of impact and the existing, disturbed condition of the riparian habitat. Additionally, impacts of the proposed action would be reduced by implementing mitigation measures to restore riparian vegetation in the project area.

Mitigation Measures Impacts to riparian habitat would be avoided or reduced by implementing the following measures. Coyote willow cuttings and cottonwood poles would be planted on the river bank along the length of the embankment in the project area (ca. 1,070 ft). This would be conducted in conjunction with mitigation for wetland impacts (*cf.* section 3.1.4.2). Coyote willow cuttings and cottonwood poles would be planted at an appropriate elevation to ensure adequate moisture in the rooting zone. This would compensate in part for loss of riparian habitat and also restore overhanging vegetation cover for aquatic habitat along the bank. Construction fencing would be placed around the large cottonwood trees at the picnic site to prevent soil compaction in their effective root zones. Fencing would be placed at or beyond the canopy drip lines of the individual trees.

3.2.3 Threatened and Endangered Species

3.2.3.1 Existing Conditions

There are 65 special status species that may occur in San Juan County (Table 3). Protection from harm, harassment, or destruction of habitat is afforded to species protected under the federal Endangered Species Act. The New Mexico Wildlife Conservation Act and New Mexico Endangered Plant Species Act protect state-listed species by prohibiting take without a permit from the New Mexico Department of Game and Fish or New Mexico Forestry and Resources Conservation Division. Of the 65 special status species in San Juan County, 14 were evaluated for their potential to occur in the project area based on habitat requirements and distribution. These species are shown in bold, highlighted text in Table 3.

Parish's Alkaligrass Habitat of Parish's alkaligrass consists of alkaline springs or seeps at the heads of drainages or on gentle slopes. The species has not been collected in the vicinity of the project area (New Mexico Rare Plant Technical Council, 1999) and its habitat is not found in the project area.

California Kingsnake California kingsnake has not been collected in the vicinity of the project area, although it is suspected to occur in the San Juan River valley (Degenhardt *et al.*, 1996: 282). Suitable riparian habitat for the species occurs in the project area.

**Table 3.** Special status plant and animal species that occur in San Juan County.

Status is: federal endangered (FE); federal threatened (FT); federal proposed as threatened (FPt) or endangered (FPe); federal candidate (FC); federal species of concern (FS); state endangered (SE); state threatened (ST); and state species of concern (SS). The state species of concern category also includes plants that have status pursuant to the New Mexico Natural Heritage Program criteria, as indicated on the New Mexico Rare Plant List. Habitat is coded as: TUN = alpine tundra; SCF = subalpine coniferous forest; MCF = Rocky Mountain upper or lower montane coniferous forest; SAG = subalpine-montane grassland; PJW = piñon-juniper woodland; MSC = montane scrub; PMG = plains-mesa grassland; DGR = desert grassland; BDS = Great Basin desert scrub; and CDS = Chihuahuan desert scrub. Special habitats are coded as: Rip = riparian; Wet = wetlands; Aq = aquatic; Rck = rock outcrops, rocky areas or cliffs; Gyp = gypsum outcrops or soils; Se = selenium-bearing soils or outcrops; Shale = shale outcrops; Snd = sandy areas. Species that occur in riparian (Rip), aquatic (Aq), or wetland (Wet) habitats in piñon-juniper woodland (PJW) and whose known or suspected distribution includes the project area may potentially occur in the project area and are highlighted in bold.

Common Name	Scientific Name	Status	Habitat
Plants (21)			
Bolack's sand verbena	<i>Abronia bolackii</i>	- SS	BDS-PJW/Gyp,Snd
San Juan false carrot	<i>Aletes maddougallii</i> ssp. <i>breviradiatus</i>	- SS	PJW-MCF/Rck,Snd
Aztec gilia	<i>Aliciella formosa</i>	FS SE	BDS
Goodding's onion	<i>Allium gooddingii</i>	FS -	MCF,SCF/Rip
San Juan milkweed	<i>Asclepias sanjuanensis</i>	- SS	BDS-PMG
Chuska milkvetch	<i>Astragalus chuskanus</i>	- SS	MCF
Cottam's milkvetch	<i>Astragalus cottamii</i>	- SS	PJW/Rck,Snd
Mancos milkvetch	<i>Astragalus humillimus</i>	FE SE	PJW/Rck,Snd
Chaco milkvetch	<i>Astragalus micromerius</i>	- SS	BDS,PJW/Gyp,Snd
Naturita milkvetch	<i>Astragalus naturitensis</i>	- SS	PJW
Arboles milkvetch	<i>Astragalus oocalycis</i>	- SS	PJW-MCF/Se
Bisti fleabane	<i>Erigeron bistiensis</i>	FS SS	PJW
Santa Fe cholla	<i>Opuntia viridiflora</i>	FS SE	PJW/Rck
Knowlton cactus	<i>Pediocactus knowltonii</i>	FE SE	PMG-PJW
narrow-mouth penstemon	<i>Penstemon breviculus</i>	- SS	PJW
Abajo penstemon	<i>Penstemon lentus</i>	- SS	PJW,MCF
Navajo Mountain phlox	<i>Phlox cluteana</i>	- SS	MCF-SCF
Mancos saltbush	<i>Proatriplex pleiantha</i>	- SS	BDS/Shale
Parish's alkali grass	<i>Puccinellia parishii</i>	FS SE	CDS-PJW/Wet
Brack hardwall cactus	<i>Sclerocactus cloveriae</i> ssp. <i>brackii</i>	FS SE	CDS/Snd
Mesa Verde cactus	<i>Sclerocactus mesae-verdae</i>	FT SE	CDS/Gyp,Shale
Invertebrates (4)			
blue-black silverspot butterfly	<i>Speyeria nokomis nokomis</i>	FS -	SCF,MCF/Wet
pearly checkerspot butterfly	<i>Charidryas acastus acastus</i>	FS -	PJW
New Mexico silverspot butterfly	<i>Speyeria nokomis nitocris</i>	FS -	SCF,MCF/Wet
San Juan tiger beetle	<i>Cicindela lengi jordai</i>	FS -	BDS-PJW/Snd
Reptiles (2)			
northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	FS -	PMG,PJW
California kingsnake	<i>Lampropeltis getula californiae</i>	- SS	BDS-PJW/Rip



Table 3, continued

Common Name	Scientific Name	Status	Habitat
Fishes (3)			
Roundtail chub	<i>Gila robusta</i>	FS SE	CDS-MCF/Aq
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	FE SE	BDS-PJW/Aq
razorback sucker	<i>Xyrauchen texanus</i>	FE SS	BDS-PJW/Aq
Birds (19)			
Brown Pelican	<i>Pelecanus occidentalis carolinensis</i>	FE SE	CDS-PJW/Aq
White-faced Ibis	<i>Plegadis chihi</i>	FS -	CDS-PJW/Aq, Wet
Bald Eagle	<i>Haliaeetus leucocephalus</i>	FT ST	CDS-MCF/Rip
Northern Goshawk	<i>Accipiter gentilis</i>	FS SS	MCF, SCF
Common Black-hawk	<i>Buteogallus anthracinus anthracinus</i>	- ST	CDS/Rip
Ferruginous Hawk	<i>Buteo regalis</i>	FS -	DGR, PMG
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	FS ST	CDS-MCF/Rck
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	FS ST	CDS-MCF
Mountain Plover	<i>Charadrius montanus</i>	FS SS	DGR, PMG
Interior Least Tern	<i>Sterna antillarum athalassos</i>	FE SE	CDS-PJW/Rip, Aq
Black Tern	<i>Chlidonias niger surinamensis</i>	FS -	CDS-PJW/Wet
Yellow-bellied Cuckoo	<i>Coccyzus americanus occidentalis</i>	FE -	BDS-PJW/Rip
Burrowing Owl	<i>Athene cunicularia hypugaea</i>	FS -	CDS, DGR, PMG
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	FT SS	MCF/Rip
Black Swift	<i>Cypseloides niger borealis</i>	- SS	PJW-SCF/Rip
Southwestern Willow Flycatcher	<i>Empidonax traillii</i>	FE SE	CDS-MCF/Rip, Aq
Loggerhead Shrike	<i>Lanius ludovicianus</i>	FS -	CDS, DGR, PMG
Gray Vireo	<i>Vireo vicinior</i>	- ST	PJW
Baird's Sparrow	<i>Ammodramus bairdii</i>	FS ST	DGR, PMG
Mammals (16)			
Least Inland Shrew	<i>Myotis ciliolabrum melanorhinus</i>	FS SS	PJW, MCF/Rip
Yuma myotis	<i>Myotis yumanensis yumanensis</i>	FS SS	DGR-MCF/Rip, Aq
little brown myotis	<i>Myotis lucifugus carissima</i>	FS SS	CDS-SCF/Rip, Aq
long-legged myotis	<i>Myotis volans interior</i>	FS SS	MCF/Rip
fringed myotis	<i>Myotis thysanodes thysanodes</i>	FS SS	DGR-MCF/Rip
long-eared myotis	<i>Myotis evotis evotis</i>	FS SS	MCF-SCF/Rip
spotted bat	<i>Euderma maculatum</i>	FS ST	PJW, MCF/Rip
big-eared Townsend's bat	<i>Corynorhinus townsendii</i>	FS SS	BDS-MCF
big free-tailed bat	<i>Myotis myotis myotis</i>	FS SS	PJW-MCF/Rip, Rck
yellow-bellied marmot	<i>Marmota flaviventris</i>	- SS	MCF-Tun
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	- SS	DGR, PMG
Navajo Mogollon vole	<i>Microtus mogollonensis navaho</i>	FS -	BDS-MCF/Wet, Rip
red fox	<i>Vulpes vulpes</i>	- SS	DGR-MCF
black-footed ferret	<i>Mustela nigripes</i>	FE -	DGR, PMG
western spotted skunk	<i>Spilogale gracilis</i>	- SS	MSC, PJW, MCF
Canada lynx	<i>Lynx canadensis</i>	FT -	MCF-Tun



Fish Species Roundtail chub, Colorado pikeminnow, and razorback sucker do not occur in the project area. Roundtail chub apparently no longer occurs in the San Juan River between Navajo Dam and the Animas River (Propst, 1999: 23). Colorado pikeminnow and razorback sucker occur downstream from the project area. Water temperatures in the reach of the San Juan River that includes the project area are likely too cold for either of these species (Holden, 2000:3-40). Critical habitat has been designated for both Colorado pikeminnow and razorback sucker in the San Juan River (Federal Register, vol. 59, no. 54, page 13374, 21 March 1994). The upstream limit of critical habitat in the San Juan River for razorback sucker is the Hogback Diversion, which is located downstream from Farmington. The upstream limit of critical habitat for Colorado pikeminnow is the N.M. Highway 371 bridge in Farmington. Consequently, the project area is not within designated critical habitat for either of these species.

Bald Eagle Bald Eagle occurs in the San Juan River valley as a wintering bird and Navajo Lake is considered a key wintering area in New Mexico for the species (Hubbard, 1985). Bald Eagles typically night-roost in groups in sheltered, forested habitats, such as canyons (New Mexico Department of Game and Fish, 1988). Suitable foraging habitat is characterized by open expanses of water with abundant prey (*e.g.* waterfowl, fish) and large trees or snags for perch sites. The large cottonwood trees in the project area provide suitable perch sites for Bald Eagle in the project area.

Yellow-billed Cuckoo and Southwestern Willow Flycatcher Both of these species nest in dense riparian shrub habitat (Sogge *et al.*, 1997; Halterman and Johnson, 2003). Suitable habitat

for these two bird species is not found in the project area.

Bat Species Although suitable foraging habitat exists in the project area for the six bat species, roosting sites that may be used by any of the six species do not occur there (Fitzgerald *et al.*, 1994).

Special Status Species Summary Special status species considered to potentially occur in the project area and be affected by rehabilitation of the diversion include California kingsnake and Bald Eagle.

3.2.3.2 Effects on Special Status Species

No Action Recurring disturbances to about 0.22 acres of riparian habitat in the project area, as described in section 3.2.2.2, would continue to impact suitable habitat for California kingsnake and Bald Eagle. Maintenance activities conducted in the winter months would reduce the suitability of perch sites in the project area for Bald Eagle.

Proposed Action The proposed action would eliminate riparian and wetland habitat in the project area that is potentially suitable for California kingsnake. However, California kingsnake is a state species of concern and is not afforded any legal protection under state or federal law. Mitigation measures that address impacts to riparian and wetland habitats in the project area would help to restore suitable habitat for the species in the project area.

Bald Eagle may be affected by the proposed action but is not likely to be adversely affected. Suitable perch trees in the project area will not be affected by the proposed action. However, Bald Eagles are sensitive to human presence and



construction activities conducted during their wintering period may cause them to move and forage at other locations. Therefore, the following measures would be implemented to minimize direct disturbance of Bald Eagles during project construction activities that take place from February through March. If a Bald Eagle is present within 0.25 miles of an active construction site in the morning before construction activity starts, or is present following breaks in project activity, the project contractor would be required to suspend all activity until the bird leaves of its own volition; or a Corps of Engineers biologist, in consultation with the U.S. Fish and Wildlife Service, determines that the potential for harassment is minimal. However, if a Bald Eagle arrives during construction activities or if an eagle is greater than 0.25 miles away, construction need not be interrupted. If Bald Eagles are consistently found in the immediate project area during the construction period, the U.S. Fish and Wildlife Service would be contacted to determine whether formal consultation under the Endangered Species Act is necessary.

Past and ongoing ditch maintenance activities, road construction and maintenance, agricultural activities, and recreational use in the project area contribute to the existing condition, which represents the combined effects of these and other actions in the project area on Bald Eagle. The appropriate area of analysis for cumulative effects to Bald Eagle is the project area, as effects of the proposed action on the species diminish markedly beyond these limits. There are no known future actions that may affect Bald Eagle in the project area. The incremental addition of disturbance associated with the proposed action will not add substantially to the effects of past and ongoing actions in the project area on the species. There will be a short-term temporal overlap of disturbances caused by the proposed action on the

existing impacts. However, the measures described above to minimize impacts to Bald Eagle will prevent the occurrence of substantial cumulative impacts to the species.

Determination of Effects to Federally Listed or Proposed Species and Critical Habitat

The USACE determines that the proposed action may affect, but is not likely to adversely affect Bald Eagle (see discussion above) and determines that there will be no effect on all other federally listed species known to occur or have occurred in San Juan County, New Mexico. The proposed project area is not within, and therefore will not affect, any proposed or designated critical habitat.



3.3 Social, Economic, and Cultural Resources

3.3.1 Visual Resources, Land Use, and Recreation

3.3.1.1 Existing Conditions

The San Juan River valley through the project area is generally pastoral and relatively free of man-made structures, one of the most prominent being the acequia itself. Other major structures visible from the project area are a home and associated ranch buildings on the north bank at the western project terminus and glimpses of N.M. Highway 511 high along the bluff on the south side of the river.

The ditch is situated between a steep hill slope on the south and an embankment of fill material on the north. A vehicle track is located on the top of the embankment and leads to the concrete head gate. At the upstream end of the embankment, the diversion groin extends north into the river channel, directing flow into the head gate and ditch (Figures 2 and 11).

Land ownership in the project area is private along both sides of the river. The north side of the San Juan River in the project area is primarily cottonwood gallery riparian forest flanked on the east and west ends by agricultural fields used for growing crops or as pasture for livestock, respectively. Figure 11 shows the riparian forest and agricultural fields at the east end of the project area across from the existing diversion.

On the south side of the river, a high, steeply sloping bluff rises above the river and acequia (Figure 10), beginning above the diversion and

continuing downstream for most of the length of the project area. The bluff is sparsely vegetated with plants typical of Great Basin desert scrub habitat, such as sagebrush and a juniper.

The river moves away from the bluff near the downstream end of the project area where the valley widens to flatter, more open land. On the south bank there is a small, relatively flat parcel of land on the old floodplain with a few mature cottonwood trees. This area is accessed by a gated, dirt road from N.M. Highway 511. At this location, the landowners have placed a picnic table and portable toilet. The landowners and their guests use the area for picnicking, fishing, wildlife viewing, and camping. The two-track road along the acequia berm provides landowners on this side of the river with a path to walk east between the river and the acequia to fish or view birds and other wildlife.

Across the river from this site, on the north river bank, is the previously-mentioned home, the only one visible from within in the project area. Although the house is situated away from the river, the residents have also created a recreation spot near the river with picnic tables and lawn chairs in the shade of mature cottonwood trees. This residence appears to be associated with pasture and cropland adjacent to the river downstream from the west project terminus.

Residences nearest the project area on the south side of the river are the approximately two dozen homes in the Vista de San Juan subdivision, about one-half mile downstream from the project area. The subdivision is visible on the map in Figure 1. Immediately downstream from the project area lie additional agricultural lands on both sides of the river. Some of the agricultural lands on the south side of the river are served by the Turley-Manzanares Acequia.



Figure 11. View of the northern bank of the Turley-Manzanares Acequia project area with agricultural fields and riparian forest. Existing diversion can be seen in the foreground. The embankment and ditch appear in lower left corner. Photo taken from overlook on N.M. Highway 511.



Recreation use of the lands along this reach of the river is limited to uses by private landowners and their guests. Public recreation use of the river includes fishing and boating (Figure 12).

In the project area, visual resources in the foreground include the San Juan River, the river banks, and the acequia system. The south river bank and embankment are vegetated with willows and Russian olive towards the eastern end of the project area. Mature cottonwoods are scattered along the south bank of the river near the west end of the project area. The riparian forest and agricultural lands are the visual elements composing the foreground views to the north.

The visual background of the project area includes rocky slopes of Manzanares Mesa south of N.M. Highway 511 and low, rolling hills on the northern horizon.



Figure 12. Recreational fishing and boating on the San Juan River in the project area.

3.3.1.2 Effects on Visual Resources, Land Use, and Recreation

No Action The no action alternative would not result in any effect on current land uses or visual resources in the project area. Land uses would continue as currently being undertaken. Management of the acequia would continue to pose problems for the Turley-Manzanares Community Ditch Association, as the issues with breaching the acequia berm and clogging the acequia with trash would not be addressed.

Proposed Action The proposed action would temporarily disrupt recreation activities in the project area while construction is undertaken. The presence of equipment and people, disturbance to the river habitat, and elevated noise levels would diminish the quality of the recreation experience for fishers in boats and along the river banks as well as recreationists pursuing other

activities (e.g. camping and picnicking on private lands along the banks, wildlife viewing.). These effects would primarily be short-term, lasting only for the duration of construction. However, removal of vegetation along the acequia berm and placing the currently open-flowing acequia ditch into a pipe may negatively change the recreation experience for the landowner on the south side of the river.

The presence of construction equipment, workers' vehicles, and other staging area facilities in the project area would detract from the otherwise pastoral setting in the project area for the four-month construction period. Installation of 103 feet of wire-rapped rip rap would have a more long-term adverse effect on the project area scenery. This negative impact would persist until vegetation growth is great enough to obscure the



wire and rock, which would be approximately three years.

This alternative would not change current agricultural land uses in the project area. Implementation of the proposed action would be expected to benefit the agricultural land users (see section 3.3.3 Socioeconomics).

The cumulative effects assessment for impacts to land use, recreation, and visual resources used the project area as the area of impact. Past, current, and future maintenance of the diversion berm (*i.e.* dumping rock, cutting willows) periodically contribute to changes in the scenery of the area. Changes in scenery resulting from the proposed project would thereby contribute to cumulative effects to visual resources.

No other past, present, or future impacts to recreation in the project corridor would occur at the same time as the proposed project effect on recreation activities. Therefore, the proposed project would not cumulatively effect recreation use. As land use in the project area would not be affected by the proposed project, there would be no cumulative impact to land use from the proposed project.

3.3.2 Cultural Resources

3.3.2.1 Existing Conditions

On 6 July 2005 a cultural resource survey was conducted of the proposed project area. The intensive pedestrian survey targeted 1,726 feet of the upstream portion of the Turley-Manzanares Acequia (including the 1,200 foot portion of the acequia that will be affected by this action), two access roads, and two staging areas (0.51 and 0.46 acres) for a total of 8.65 acres. The entire 2.8-

mile alignment of the Turley-Manzanares Acequia was also recorded and photodocumented.

Prior to the intensive survey, an archival literature search and a search of the New Mexico Archaeological Records Management Section's database was completed. The State Register of Cultural Properties and the National Register of Historic Places were also consulted. No archaeological sites or historic properties are known to occur in the immediate vicinity of the project area. American Indian Tribes that have indicated that they have cultural resource concerns in San Juan County were given the opportunity to comment on the proposed project; no traditional cultural properties are known to occur in the vicinity of the project area.

During the cultural survey, two in-use, historic water delivery systems were identified and recorded (Pierantoni, 2005). These included the Citizens Ditch and the Turley-Manzanares Acequia. The Citizens Ditch is crossed by a project access road on the north side of the river. The Turley-Manzanares Acequia, on the south side of the river, was also recorded and photodocumented in its entirety. No additional archaeological sites or historic properties were identified. Segments of the Citizens Ditch have been previously recorded as archaeological sites, LA99826, LA100341, and LA107469.

The Citizens Ditch has previously been determined to be eligible for nomination to the National Register of Historic Places under criteria a, b, and c, of 36 CFR 60.4, and the current project recommends that the acequia is also eligible under criterion d. The Turley-Manzanares Acequia is recommended as eligible for nomination to the National Register under criteria c and d, and upon further documentation, the project area may be considered as potentially eligible to the National Register as a rural historic



landscape. No further study is recommended for the current project.

3.3.2.2 Effects on Cultural Resources

The proposed Turley-Manzanares Acequia rehabilitation project would utilize an existing access road on the north side of the river; identified as Access Road No. 1. Access Road No. 1 includes a wooden bridge that crosses the Citizens Ditch. The wooden bridge is supported by steel girders and reinforced concrete abutments. Use of the bridge and Access Road No. 1 during the construction of the proposed rehabilitation project would have no effect to either the bridge, the road, nor to the historic and National Register eligible Citizens Ditch.

The proposed rehabilitation project plans to rehabilitate the Turley-Manzanares Acequia's diversion structure and 1,200 lineal feet of the upstream portion of the irrigation ditch. The historic Turley-Manzanares Acequia, dating to c. 1876, is recommended as eligible for nomination to the National Register. However, the diversion structure and the irrigation ditch in its entirety has been subject to numerous years of maintenance and an unknown number of previous rehabilitation projects, much of the modern maintenance work being conducted with heavy equipment. The proposed rehabilitation would not adversely affect the acequia's alignment, form, nor its intended function, those historic elements that contribute to the acequia's eligibility for listing on the National Register.

The project area, upon further documentation, is potentially eligible for nomination to the National Register as a rural historic landscape. The proposed rehabilitation would have no effect to the local landscape. The Corps, therefore, is of the opinion that the proposed rehabilitation

project would have "No Adverse Effect to Historic Properties."

3.3.3 Socioeconomics and Environmental Justice

Regulations for implementing NEPA require analysis of social effects when they are interrelated with effects on the physical or natural environment (40 CFR §1508.14). Federal agencies are required to "*identify and address disproportionately high and adverse human health or environmental effects*" of their programs and actions on minority populations and low-income populations, as directed by Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

3.3.3.1 Existing Conditions

Communities The project area is located in rural, unincorporated San Juan County, New Mexico. The small communities of Aztec, New Mexico and Bloomfield, New Mexico are approximately 20 miles northwest and 16 miles southwest of the project area, respectively. The closest full-service community is Farmington, New Mexico, about 30 miles west of the project area. Farmington has emergency services (i.e. fire, medical, police), a hospital, a small airport, a public library, public schools, a four-year college, and public recreation and cultural facilities. The village of Turley is located on the south side of the San Juan River about one mile west of the project end (Figure 1).

Population San Juan County had a population of 113,801 in 2000 (U.S. Census Bureau, 2005a). A July 2004 estimate has the population topping 124,000 (<http://www.co.san-juan.nm.us>). In



2000, Aztec and Bloomfield had populations of about 6,400 persons each (U.S. Census Bureau, 2005a). The City of Farmington currently has an estimated population of 41,000 (City of Farmington, 2005).

Economics Aztec is the seat of San Juan County and, thus, is the center for various county services. The oil and gas industry is a major employer in San Juan County. Bloomfield, in fact, bills itself as the “Gas Capitol of the United States” (<http://www.sanjuaneds.com>). Leading employers in the county are Central Consolidated Schools, Farmington Public Schools, San Juan Regional Medical Center, each employing more than 1,000 persons (<http://www.sanjuaneds.com>). Other major employers are Arizona Public Service, BHP-Utah, City of Farmington, Basin Home Health, Public Service Company of New Mexico, and San Juan College.

Environmental Justice The project area is within San Juan County census tract 7.03. Census tract 7.03 is bounded on the south and east by U.S. Highway 64, on the north by the Colorado-New Mexico border, and on west by N.M. Highway 544. Approximately the east half of Bloomfield is included in census tract 7.03.

Social and cultural conditions in New Mexico, Bloomfield, and San Juan County census tract 7.03 are relatively homogenous. Between 62 percent and 67 percent of the population of each of these three geographic areas is white (Table 4). However, in San Juan County as a whole, only about 52.8 percent of the population is white. This is contrasted by a much higher American Indian population in the county (36.9 percent), owing to a portion of the Navajo Reservation being located in the northwestern part of the county. This compares to an American Indian population ranging from 9.5 percent to 16.7

percent in census tract 7.03, Bloomfield, or the state of New Mexico. The populations of Bloomfield and San Juan County census tract 7.03 are about 27 percent and 36 percent Hispanic, respectively, as compared to only 15 percent of San Juan County and more than 42% of the State of New Mexico (Table 4).

Income data indicate that the percentage of persons living below the poverty level in San Juan County census tract 7.03 (13.1 percent) is lowest of the four geographic areas compared in Table 4. This is about two-thirds the San Juan County rate of 21.5 percent of persons living below poverty level.

3.3.3.2 Effects on Socioeconomics and Environmental Justice

No Action As no changes would occur in the project area with the no action alternative, there would be no effects related on socioeconomics of the area and no effects related to environmental justice issues. The Turley-Manzanares Community Ditch Association would continue to maintain the open ditch, an increasingly costly operation.

Proposed Action There would be no effect from the proposed project on community services, such as law enforcement, fire protection, emergency medical care, or schools. No property would be acquired so no residents or businesses would be affected by relocations. The proposed project is not expected to create adverse effects on human health or the environment.



Table 4. Selected social demographic data for the state of New Mexico, San Juan County, San Juan County census tract that includes the project area, and the city of Bloomfield (U.S. Census Bureau, 2005a, 2005b, 2005c, 2005d, 2005e).

Social Demographic Factor	New Mexico	San Juan County	Bloomfield	San Juan County Census Tract 7.03
Total population	1,829,146	113,801	6,417	5,575
Race (percent of total population)				
white	66.8%	52.8%	62.4%	65.2%
black	1.9%	0.4%	0.3%	0.2%
American Indian	9.5%	36.9%	16.7%	10.7%
Asian	1.1%	0.3%	0.3%	0.3%
Hawaiian or Pacific Islander	0.1%	0.0%	0.1%	0.1%
some other race	17.0%	6.8%	16.0%	19.5%
two or more races	3.6%	2.8%	4.2%	4.2%
Hispanic origin (percent of total population)				
Hispanic or Latino (of any race)	42.1%	15.0%	27.5%	36.2%
not of Hispanic origin	57.9%	85.0%	72.5%	63.8%
Age				
median age (years)	34.6	31.0	31.4	33.9
65 years and over (% of total pop.)	11.7%	9.0%	10.4%	10.2%
Income				
per capita income (dollars)	\$17,261	\$14,196	\$14,424	\$14,618
persons below poverty level	18.4%	21.5%	14.7%	13.1%



Implementation of the proposed action is expected to economically benefit the Turley-Manzanares Community Ditch Association by reducing long-term maintenance costs. Reduced costs would result from decreasing hours of labor and other expenses currently required to maintain the open ditch system, thereby making farming operations more profitable. In addition, construction of the project would provide some short-term economic benefits for local businesses, most likely in Bloomfield, Aztec, and Farmington. Depending on whether the construction contractor is local or not, economic benefits may result in the form of purchasing supplies, renting equipment, workers' wages, and hotel and meal purchases. State gross receipts taxes on goods and services purchased locally further benefit the area economy. These modest economic benefits would contribute to cumulative effects on the local economy.

In order to establish that the proposed project would create disproportionate adverse effects on minority or low-income populations, two criteria would need to be met. First, the project would have to create adverse effects on local populations. Since there are no anticipated adverse effects on local populations, the proposed project does not meet this criteria.

Second, the affected population would have to be disproportionately composed of racial minorities or low-income persons as compared to a larger population. In this case, the project area (San Juan County census tract 7.03) was compared to each the entire county and state overall.

The percentage white persons living in census tract 7.03 is approximately the same as or greater than the state of New Mexico and San Juan County (Table 4). The percentage of persons of Hispanic origin is greater in the project area than in county but less than in the state. Census tract

7.03 has a lower percentage of persons living below poverty level than New Mexico or San Juan County.

The racial and economic profiles of the project area are similar to the state population. There would be no disproportionate effect, adverse or otherwise, on minority or low-income populations in the census tract encompassing the project area. Therefore, the proposed action complies with Executive Order 12898.

3.4 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources are those effects that cannot be reversed. For example, the extinction of a species is an irreversible commitment. Irretrievable commitments of resources are those that are lost for a period of time, but may be reversed, such as building a shopping center on farmland. The land cannot be used for farming again until the pavement is removed and soils are restored to productivity. There are no irreversible or irretrievable commitments of resources associated with the proposed project.

3.5 Cumulative Effects Summary

Cumulative effects are analyzed individually for each resource area in sections 3.1 through 3.3. These analyses address the cumulative impact of the direct and indirect effects of the proposed action when added to the aggregate effects of past, present, and reasonably foreseeable future actions. For all resources, the aggregate effect of past and present actions was considered to be represented



by the current, existing condition of the resource (Council on Environmental Quality, 2005). Therefore, the specific effects of individual past and present actions typically were not cataloged in the analysis. In order for direct or indirect effects to incrementally add to the effects of past, present, or reasonably foreseeable future actions, they must overlap with those effects in time or space (Council on Environmental Quality, 1997).

Identification of cumulative effects issues was conducted during scoping (*cf.* Council on Environmental Quality, 1997: 11). The New Mexico Department of Game and Fish expressed concern about the cumulative effect of multiple irrigation diversions "on the San Juan River" (Appendix A). No other cumulative effects issues were identified during scoping.

The time frame for analysis of cumulative effects varied, depending on the duration of direct and indirect effects. For example, direct effects resulting from construction were expected to persist for relatively short periods of time (up to about two months). Conversely, indirect effects resulting from operation of the rehabilitated diversion structure would persist for the life of the facility. Similarly, the geographic bounds for cumulative effects analysis varied with the resource under consideration, depending on zone of influence of the direct or indirect impact being analyzed.

The cumulative effects analyses for resources discussed in section 3.1 through 3.3 are summarized in Table 5.

Table 5. Summary of cumulative effects of the proposed action.

Resource	Effects of Past and Present Actions	Effects of Proposed Action	Effects of Future Actions	Cumulative Effects
Soils	Disturbance of 0.34 acres on regular basis resulting from ongoing maintenance of diversion.	Disturbance of 1.62 acres from placement of fill.	No reasonably foreseeable future actions are proposed in the project area that would affect soils.	Effects of proposed action would not overlap in space or time with effects of past, present, or reasonably foreseeable future actions.
Water Resources	Diversion of un-quantified amount of water from San Juan River (diversion is not gaged); periodic, short-term increases in turbidity and suspended sediment in San Juan River from maintenance of diversion groin, heading structure, and ditch embankment.	Short-term increases in turbidity and suspended sediment during rehabilitation of the guide weir and heading structure; if flows remain above 500 cfs during construction, 10 NTU turbidity standard would not be exceeded. Amount of water withdrawn from river would not change, as dimensions and elevations of the rehabilitated diversion and inlet would be the same as the existing facility.	Possible reduction of summer base flows from modified operation of Navajo Dam for recovery of razorback sucker and Colorado pikeminnow.	The preferred alternative for operation of Navajo Dam would set a minimum flow of 250 cfs below Navajo Dam, with an average flow in January of 300 cfs. If construction occurred during flows lower than about 500 cfs, the 10 NTU turbidity standard could be exceeded. However, elevated turbidity levels would persist for several days at most and in a relatively short reach of the river downstream from the diversion groin, probably no more than about 1,640 ft.



Resource	Effects of Past and Present Actions	Effects of Proposed Action	Effects of Future Actions	Cumulative Effects
Wetlands	About 0.04 acres of wetlands disturbed periodically by maintenance and repair of the diversion groin and heading structure.	About 0.03 acres of wetlands would be subject to fill.	No reasonably foreseeable future actions are proposed in the project area that would affect wetlands.	Effects of proposed action would not overlap in space or time with effects of past, present, or reasonably foreseeable future action.
Air Quality	The project area is currently in attainment of all federal air quality standards.	Minor, short-term effects to local air quality from heavy equipment emissions at the construction site. An increase in particulates would be expected as a result of soil disturbance, as would localized concentrations of carbon monoxide from equipment operation during construction.	No reasonably foreseeable future actions are proposed in the project area that would affect air quality.	Effects of proposed action would not overlap in space or time with effects of past, present, or reasonably foreseeable future action.
Noise	Low noise levels; primary noise source is nearby highway.	Temporary increases in noise levels from the operation of heavy equipment which would last approximately four months during day time hours.	No reasonably foreseeable future actions are proposed in the project area that would affect noise levels.	The increase in noise generated by construction would add to noise levels from vehicles on N.M. Highway 511 and U.S. Highway 64, resulting in a cumulative increase in noise levels during the period of construction.
Terrestrial Habitat	Regular disturbance caused by recreational use, ditch maintenance, vehicle access.	Temporary impacts to about 0.3 acres of land characterized by sparse vegetation cover, currently used as parking area.	No reasonably foreseeable future actions are proposed in the project area that would affect terrestrial habitat.	The proposed action will result in incremental, temporal loss of 0.3 acres of terrestrial habitat in the project area that will add to impacts from past and ongoing actions. This effect is likely to persist for up to five years. The cumulative effect on terrestrial habitat is not likely to result in any measurable changes in overall habitat quality, population persistence, or viability of any terrestrial wildlife species in the project area.



Resource	Effects of Past and Present Actions	Effects of Proposed Action	Effects of Future Actions	Cumulative Effects
Riparian and Aquatic Habitat and Wildlife	<p>About 0.22 acres of riparian habitat subject to recurring impacts from ditch cleaning, brush-hogging, herbicide application, embankment repair, and equipment operation on the ditch embankment.</p> <p>About 2,000 ft² of stream bottom periodically impacted by maintenance of the diversion groin. This disturbance likely causes short-term increases in turbidity and suspended sediments as well as incidental mortality of aquatic invertebrates and some individuals of small benthic fish species including speckled dace and mottled sculpin.</p>	<p>The proposed action would remove 0.42 acres of riparian vegetation on the embankment between the ditch and the river.</p> <p>About 0.41 acres of low-velocity aquatic habitat in the open ditch would be eliminated by placing the ditch in a buried pipe. About 5,487 ft² of stream substrate in riffle habitat would be disturbed by construction of the new ditch heading and guide weir. The effect of this substrate disturbance would be short-term increases in turbidity and suspended sediment.</p>	<p>Possible reduction of summer base flows from modified operation of Navajo Dam for recovery of razorback sucker and Colorado pikeminnow.</p>	<p>Short-term temporal (<i>i.e.</i> a period of no more than one month) and spatial overlap with past and present impacts on aquatic habitat. No ecologically meaningful residual impact from the proposed action on aquatic habitat. Impacts to aquatic habitat may overlap temporally with potential re-operation of Navajo Dam. The cumulative effects of these actions may include increased turbidity in the project area for short periods of time.</p> <p>Proposed action would result in cumulative impacts to riparian vegetation, when added to effects of past and ongoing actions. These effects would not exceed any ecologically meaningful thresholds for population persistence or viability of any wildlife species, due to the relatively small area of impact and the existing, disturbed condition of the riparian habitat. Additionally, impacts of the proposed action would be reduced by implementing mitigation measures to restore riparian vegetation in the project area.</p>
Special-Status Species	<p>Recurring disturbances to about 0.22 acres of riparian habitat in the project area impact suitable habitat for California kingsnake and Bald Eagle. Maintenance activities conducted in the winter months reduce the suitability of perch sites in the project area for Bald Eagle.</p>	<p>The proposed action would eliminate riparian and wetland habitat in the project area that is potentially suitable for California kingsnake. However, California kingsnake is a state species of concern and is not afforded any legal protection under state or federal law. Mitigation measures that address impacts to riparian and wetland habitats in the project area would help to restore suitable habitat for the species in the project area.</p> <p>Bald Eagle may be affected by noise disturbance during construction associated with the proposed action but is not likely to be adversely affected. Suitable perch trees in the project area will not be affected.</p>	<p>No reasonably foreseeable future actions are proposed in the project area that would affect California kingsnake or Bald Eagle.</p>	<p>The incremental addition of disturbance associated with the proposed action will not add substantially to the effects of past and ongoing actions in the project area on Bald Eagle. There will be a short-term temporal overlap of disturbances caused by the proposed action on the existing impacts. Measures to minimize impacts to Bald Eagle will prevent the occurrence of substantial cumulative impacts to the species.</p>



Resource	Effects of Past and Present Actions	Effects of Proposed Action	Effects of Future Actions	Cumulative Effects
Visual Resources, Land Use, and Recreation	Existing conditions described in text represent effects of past and ongoing actions; no substantial impairment of these resources.	<p>Diminished quality of recreation experience for fishers in boats and along the river banks as well as recreationists pursuing other activities. These effects would primarily be short-term, lasting only for the duration of construction. Removal of vegetation along the embankment and placing the ditch in a pipe may negatively change the recreation experience for the landowner on the south side of the river.</p> <p>The presence of construction equipment, workers' vehicles, and other staging area facilities in the project area would detract from the otherwise pastoral setting in the project area for the four-month construction period. Installation of 103 feet of wire-rapped rip rap would have a more long-term adverse effect on the project area scenery. This negative impact would persist until vegetation growth is great enough to obscure the wire and rock, which would be approximately three years.</p>	No reasonably foreseeable future actions are proposed in the project area that would affect visual resources, land use, and recreation.	Effects of proposed action would not overlap in space or time with effects of past, present, or reasonably foreseeable future action.
Cultural Resources	Acequia system has been affected by past and ongoing maintenance and rehabilitation work.	Proposed action would impact 1,200 feet of ditch. The proposed rehabilitation would not adversely affect the acequia's alignment, form, nor its intended function, those historic elements that contribute to the acequia's eligibility for listing on the National Register.	No reasonably foreseeable future actions are proposed in the project area that would affect cultural resources.	Effects of proposed action would not overlap in space or time with effects of past, present, or reasonably foreseeable future action.
Socio-economics and Environmental Justice	Existing conditions described in text represent effects of past and ongoing actions.	There would be no effect from the proposed project on community services, such as law enforcement, fire protection, emergency medical care, or schools. No property would be acquired so no residents or businesses would be affected by relocations. The proposed project is not expected to create adverse effects on human health or the environment.	No reasonably foreseeable future actions are proposed in the project area that would affect socioeconomic conditions or environmental justice concerns.	Effects of proposed action would not overlap in space or time with effects of past, present, or reasonably foreseeable future action.



4.0 LIST OF PREPARERS

The EA was prepared by the Albuquerque District project delivery team, including Blue Earth & Mussetter, LLC and their subconsultants. Members of the team included:

Albuquerque District, Corps of Engineers

Patricia Phillips	Civil Project Management Branch
Brett Thompson	Biologist, Environmental Resources Section
Gregory Everhart	Archaeologist, Environmental Resources Section
Champe Green	Ecologist, Environmental Resource Section (Quality Control)
Julie Hall	Supervisory Ecologist, Environmental Resources Section (Quality Control)
Fermin Chavez	Hydrology and Hydraulics Section

Consultants

Karen Yori	Project Manager/Planner, Blue Earth Ecological Consultants, Inc.
John Pittenger	Senior Ecologist, Blue Earth Ecological Consultants, Inc.
Dr. Charles Wheeler	Principal Investigator, Western Cultural Resource Management, Inc.



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5.0 CONSULTATION AND COORDINATION

The following agencies and organizations were consulted during the planning process for the Turley-Manzanares Acequia Rehabilitation Project:

U.S. Bureau of Reclamation, Southern Water Management Team
U.S. Environmental Protection Agency, Region 6
U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office
U.S. Fish and Wildlife Service, San Juan River Basin Recovery Implementation Program
U.S.D.A. Natural Resources Conservation Service
New Mexico Department of Game and Fish, Conservation Services Division
New Mexico Department of Game and Fish, Fisheries Management Division
New Mexico Energy, Minerals and Natural Resources Department, Rare Plants Program
New Mexico Environment Department, Surface Water Quality Bureau
New Mexico Historic Preservation Officer
New Mexico Interstate Stream Commission
Hopi Tribe
Kiowa Tribe
Laguna Pueblo
Navajo Nation
Southern Ute Tribe
Ute Mountain Ute Tribe
San Juan County
Turley-Manzanares Community Ditch Association

Copies of the EA were also provided to:

Postmaster
1787 Highway 173
Navajo Dam, New Mexico 87419

Bloomfield City Government Library
333 South 1st Street
Bloomfield, New Mexico 87413



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6.0 LITERATURE CITED

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APPENDIX A

Public, Agency, and Tribal Scoping, Consultation, and Coordination

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SCOPING LETTER & ATTACHMENTS



Blue Earth Ecological Consultants, Inc.

31 May 2005

Dear Interested Party:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico State Engineer and the Turley-Manzanares Community Ditch Association, is planning the rehabilitation of the Turley-Manzanares Community Ditch diversion dam and conveyance structures under the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The project area is located on the San Juan River near the village of Turley, San Juan County, New Mexico (Figure 1).

Rehabilitation is needed because the existing system for delivering water is difficult and costly to operate and maintain. General project components currently being considered for acequia rehabilitation include: 1) replacing the existing heading structure with either a gated heading or an inflatable bladder dam with a split weir; 2) installing 1,200 linear feet of 36-inch reinforced concrete pipe; and 3) placing wire-wrapped rip-rap along 1,200 feet of the riverside embankment. The main objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members.

The Corps is seeking public and agency input for consideration during planning of the project. Your input will be used in preparing an environmental assessment to comply with the National Environmental Policy Act (NEPA) currently being prepared by Blue Earth Ecological Consultants, Inc. under contract to the Corps.

Please mail or fax comments by **30 June 2005**. You may use the attached form or send a letter to the address on the form. If you have any questions or require additional information, please contact Ms. Karen Yori at (505) 983-2687 x106.

Sincerely,

Karen Yori
Senior Planner

Figure 1. The project area on the San Juan River near the village of Turley in San Juan County, New Mexico.



**Turley-Manzanares Acequia Rehabilitation Project
San Juan County, New Mexico**

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the project?

2. Other comments about the project.

Please attach additional sheets if desired.

- ☐ Please keep my name on the project mailing list.
- ☐ Please remove my name from the project mailing list.

Name: _____

Address: _____

City, State, Zip: _____

Please mail, e-mail, or fax your specific written comments **for receipt by close of business on 30 June 2005** to:

Karen Yori
Blue Earth Ecological Consultants, Inc.
1345 Pacheco Street
Santa Fe, NM 87505

Fax: (505) 983-2960

e-mail: kyori@blueearthecological.com

**Mailing List
for the
Turley-Manzanares Section 1113 Acequia Rehabilitation Project
San Juan County, New Mexico**

**TURLEY-MANZANARES ACEQUIA
REPRESENTATIVE**

Mr. Pat Montoya
211 Highway 511
Blanco, New Mexico 87412

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6
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New Mexico Ecological Services Field Office
U.S. Fish and Wildlife Service
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Bureau of Reclamation
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Program Coordinator
San Juan River Basin Recovery Implementation
Program
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STATE AGENCIES

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Conservation Services Division
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1 Wildlife Way
Santa Fe, New Mexico 87507

Robert Sivinski, Botanist
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Cf:
Leigh Kuwanwisiwma, Director
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Hopi Tribal Council
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Laguna Pueblo:
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Pueblo of Laguna
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Cf:

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Kiowa Tribe of Oklahoma
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Window Rock, Arizona 86515

Cf:

Alan S. Downer, Ph.D., Director
Historic Preservation Department
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P.O. Box 4950
Window Rock, Arizona 86515

Southern Ute Tribe:

Clement Frost, Chairman
Southern Ute Tribe
P.O. Box 737
Ignacio, Colorado 81137

Ute Mountain Ute Tribe:

Selwyn Whiteskunk, Chair
Ute Mountain Ute Tribe
General Delivery
Towaoc, Colorado 81334

POSTMASTER

Postmaster
1787 Highway 173
Navajo Dam, New Mexico 87419

LIBRARY CLOSEST TO PROJECT

Bloomfield City Government Library
333 South 1st Street
Bloomfield, New Mexico 87413

NEWS MEDIA

Farmington Daily Times
201 North Allen
Farmington, New Mexico 87499



Blue Earth Ecological Consultants, Inc.

31 May 2005

Honorable Clement Frost
Southern Ute Tribe
P.O. Box 737
Ignacio, Colorado 81137

Dear Chairman Frost:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico State Engineer and the Turley-Manzanaras Community Ditch Association, is planning the rehabilitation of the Turley-Manzanaras Community Ditch diversion dam and conveyance structures under the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The project area is located on the San Juan River near the village of Turley, San Juan County, New Mexico (Figure 1).

Rehabilitation is needed because the existing system for delivering water is difficult and costly to operate and maintain. General project components currently being considered for acequia rehabilitation include: 1) replacing the existing heading structure with either a gated heading or an inflatable bladder dam with a split weir; 2) installing 1,200 linear feet of 36-inch reinforced concrete pipe; and 3) placing wire-wrapped rip-rap along 1,200 feet of the riverside embankment. The main objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members.

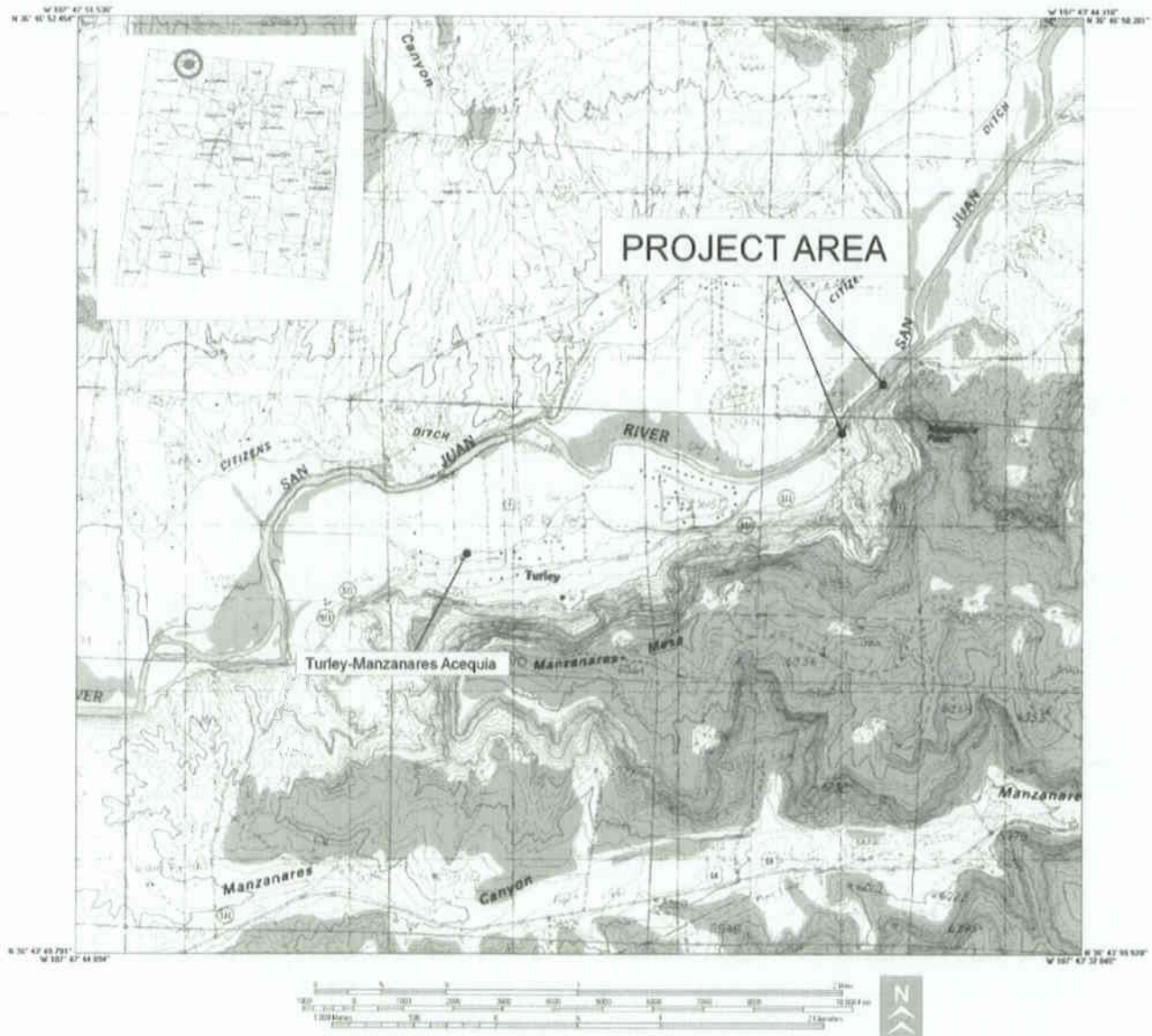
The Corps is seeking public and agency input for consideration during planning of the project. Your input will be used in preparing an environmental assessment to comply with the National Environmental Policy Act (NEPA) currently being prepared by Blue Earth Ecological Consultants, Inc. under contract to the Corps.

Please mail or fax comments by **30 June 2005**. You may use the attached form or send a letter to the address on the form. If you have any questions or require additional information, please contact Ms. Karen Yori at (505) 983-2687 x106.

Sincerely,

Karen Yori
Senior Planner

Figure 1. The project area on the San Juan River near the village of Turley in San Juan County, New Mexico.



**Turley-Manzanares Acequia Rehabilitation Project
San Juan County, New Mexico**

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the project?

2. Other comments about the project.

Please attach additional sheets if desired.

- ☐ Please keep my name on the project mailing list.
- ☐ Please remove my name from the project mailing list.

Name: _____

Address: _____

City, State, Zip: _____

Please mail, e-mail, or fax your specific written comments **for receipt by close of business on 30 June 2005** to:

Karen Yori
Blue Earth Ecological Consultants, Inc.
1345 Pacheco Street
Santa Fe, NM 87505

Fax: (505) 983-2960

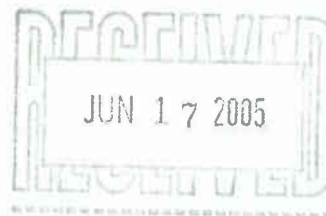
e-mail: kyori@blueearthecological.com



Blue Earth Ecological Consultants, Inc.

31 May 2005

Honorable Roland Johnson
Pueblo of Laguna
P.O. Box 194
Laguna Pueblo, New Mexico 87026



Dear Governor Johnson:

The U.S. Army Corps of Engineers (Corps), Albuquerque District, at the request of the New Mexico State Engineer and the Turley-Manzanares Community Ditch Association, is planning the rehabilitation of the Turley-Manzanares Community Ditch diversion dam and conveyance structures under the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The project area is located on the San Juan River near the village of Turley, San Juan County, New Mexico (Figure 1).

Rehabilitation is needed because the existing system for delivering water is difficult and costly to operate and maintain. General project components currently being considered for acequia rehabilitation include: 1) replacing the existing heading structure with either a gated heading or an inflatable bladder dam with a split weir; 2) installing 1,200 linear feet of 36-inch reinforced concrete pipe; and 3) placing wire-wrapped rip-rap along 1,200 feet of the riverside embankment. The main objective of the acequia rehabilitation project is to improve the efficiency of water delivery to the acequia members.

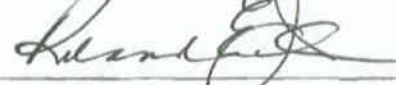
The Corps is seeking public and agency input for consideration during planning of the project. Your input will be used in preparing an environmental assessment to comply with the National Environmental Policy Act (NEPA) currently being prepared by Blue Earth Ecological Consultants, Inc. under contract to the Corps.

Please mail or fax comments by **30 June 2005**. You may use the attached form or send a letter to the address on the form. If you have any questions or require additional information, please contact Ms. Karen Yori at (505) 983-2687 x106.

Sincerely,


Karen Yori
Senior Planner

The Pueblo of Laguna has determined that the Proposed Project WILL NOT affect any objects sites or location of traditional religious or cultural importance to the Pueblo of Laguna.



Roland Johnson, Governor
Pueblo of Laguna

06-16-05

Date

Turley-Manzanares Acequia Rehabilitation Project
San Juan County, New Mexico

Comment Form

Please make your comments specific to the proposal described in the attached letter.

1. What issues (for example, natural or cultural resources, social, or economic) are of concern to you in regards to the project?

The project is needed so that we can take water out of our ditch (Manzanares-Turley) for our farms. we depend on our Corps to maintain our community. the cost is too much for the ditch Co. to do with ditch funds.

2. Other comments about the project.

When the water is raised by the release of the Nevada Dam it destroys our diversion & the head of our ditch. Every year we have to repair the damage caused by this high water.

Thank you

Please attach additional sheets if desired.

JUN 15 2005

- ☒ Please keep my name on the project mailing list.
- ☐ Please remove my name from the project mailing list.

Name: Pst Montoya

Address: 211 Hwy. 511

City, State, Zip: Blanco, N. 87412

Please mail, e-mail, or fax your specific written comments **for receipt by close of business on 30 June 2005** to:

Karen Yori
Blue Earth Ecological Consultants, Inc.
1345 Pacheco Street
Santa Fe, NM 87505

Fax: (505) 983-2960

e-mail: kyori@blueearthecological.com

GOVERNOR
Bill Richardson



STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8008
Fax: (505) 476-

Visit our website at www.wildlife.state.nm.us
For basic information or to order free publications: 1-800-862-9310

STATE GAME COMMISSION
Guy Riordan, Chairman
Albuquerque, NM

Dr. Tom Arvas, Vice-Chairman
Albuquerque, NM

Alfredo Montoya, Commissioner
Alcalde, NM

David Henderson, Commissioner
Santa Fe, NM

Peter Pino, Commissioner
Zia Pueblo, NM

Leo Sims, Commissioner
Hobbs, NM

M. H. "Dutch" Salmon, Commissioner
Silver City, NM

DIRECTOR AND SECRETARY
TO THE COMMISSION
Bruce C. Thompson

June 14, 2005

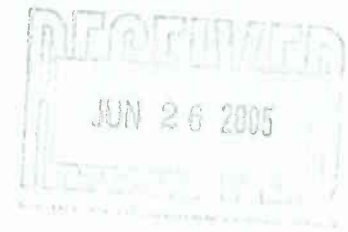
Ms. Karen Yori, Senior Planner
Blue Earth Ecological Consultants, Inc.
1345 Pacheco Street
Santa Fe, New Mexico 87505

Re: Scoping Comments: Turley-Manzanares Acequia Rehabilitation Project
San Juan County, New Mexico
NMGF No. 10126

Dear Ms Yori:

In response to your letter dated May 31, 2005, regarding the above referenced project, the New Mexico Department of Game and Fish (NMDGF) has identified issues of concern we would like you to analyze in depth as part of the environmental assessment for the project.

1. Effects on water quality. Analyze the potential effects of project construction on water quality. Adverse effects on water quality can be minimized by insuring that requirements of Sections 401 and 404 of the Clean Water Act are met. Implementation of applicable Best Management Practices will also contribute to protection of water quality. Because extensive in-water work will be necessary for access and construction, mitigation will be required to compensate for in-stream habitat effects and to ensure no net loss of wetland function and value. Analyze the relative effects of access from below the bluff versus from the north side of the river.
2. Protection of listed fish and wildlife. Analyze potential effects of the proposed project on federally listed species, including Colorado pike-minnow and razorback sucker that are known to occur downstream, and conduct Section 7 consultation under the Endangered Species Act with the U.S. Fish and Wildlife Service as necessary.
3. Cumulative effects. Analyze the cumulative effects of multiple acequia diversion rehabilitation or reconstruction projects on the San Juan River.
4. Effects of wire-wrapped riprap (i.e., gabions). The NMDGF recommends against the use of gabions in this project, and would like to see an in-depth analysis of the effects of gabions as in-stream structures. The use of gabions for in-stream structures are undesirable due to their poor stability and unreliability. Gabions generally have low biotic potential for in-stream habitat. Gabions create unwanted debris in the stream when the gabion baskets inevitably come apart and wash downstream. The use of gabions may result in higher long-term maintenance and replacement costs, as compared to other designs. If gabions are to be used in this project, it is important to determine the critical shear stress and the critical stream velocity that will be experienced at the project site, so that the gabion structures are properly designed (Freeman and



Fischenich 2000¹). The environmental analysis should include the long-term effects of failure of the gabions.

5. Effects on fish passage and entrainment. Fishes known to occur in the San Juan River at River Mile 214 (the project site) include bluehead sucker, flannelmouth sucker, and speckled dace. Analyze the potential effects of construction and operation of the two diversion options on upstream fish passage. Adverse effects can be avoided by providing an appropriate fish passage structure for the full-spanning bladder dam diversion. Analyze the potential for entrainment of fish in the acequia. Entrainment in the concrete pipe can be avoided through screening of the intake.
6. Mitigation for adverse effects. Mitigate for impacts to riparian and river bank wetlands where net loss of structure or function results by replanting with native plants such as willow and cottonwood. Mitigate for adverse impacts to in-channel habitats where net loss of structure or function results. Seek opportunities for enhancement of in-stream channel and riparian habitats, regardless of the degree of impact, as part of the project.
7. Alternative diversion points. Analyze the feasibility and potential effects of re-locating the diversion point downstream past the bluff. If an alternative location is available, the Department recommends locating the diversion at a site that minimizes in-stream effects of access, construction, and operation.

For your information, we have enclosed a list of sensitive, threatened and endangered species that occur in San Juan County. For more information on listed and other species of concern, contact the following sources:

1. Species Accounts: <http://fwic.fw.vt.edu/states/nm.htm>
2. Species Searches: <http://nmnhp.unm.edu/bisonm/bisonquery.php>
3. New Mexico Wildlife of Concern by Counties List:
http://www.wildlife.state.nm.us/conservation/share_with_wildlife/documents/speciesofconcern.pdf
4. Habitat Handbook Project Guidelines:
http://wildlife.state.nm.us/conservation/habitat_handbook/index.htm
5. For custom, site-specific database searches on plants and wildlife. Go to Data then to Free On-Line Data and follow the directions go to: <http://nmnhp.unm.edu>
6. New Mexico State Forestry Division (505-827-5830) or <http://nmrareplants.unm.edu/index.html> for state-listed plants
7. For the most current listing of federally listed species **always** check the U.S. Fish and Wildlife Service at (505-346-2525) or <http://ifw2es.fws.gov/EndangeredSpecies/lists/>.

Thank you for the opportunity to provide scoping comments for this project. If you have any questions please contact Randy Floyd at (505) 476-8091 or rfloyd@state.nm.us.

Sincerely,



Lisa Kirkpatrick, Chief
Conservation Services Division

LK/rif

xc: Susan MacMullin, New Mexico Ecological Services, USFWS
Brian Gleadle, NW Area Operations Chief, NMGF
Steve Anderson, NW Area Habitat Specialist, NMGF

¹ Freeman, G.E. and J.C. Fischenich. 2000. Gabions for Streambank Erosion Control. Ecosystem Management and Restoration Research Program Technical Notes Collection (ERDC TN-EMRRP SR-22). Engineer Research and Development Center, Vicksburg, MS.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna Road, NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525; Fax: (505) 346-2542

JUN 29

Cons. #2-22-05-1-0425

Karen Yori, Senior Planner
Blue Earth Ecological Consultants, Inc.
1345 Pacheco Street
Santa Fe, New Mexico 87505

Dear Ms. Yori:

Thank you for your May 19, 2005, letter requesting information on threatened or endangered species that could be affected by the rehabilitation of the Turley-Manzanares Community Ditch diversion dam and conveyance structures in San Juan County, New Mexico.

We have enclosed a current list of federally endangered, threatened, proposed, and candidate species, and species of concern that may be found in San Juan County, New Mexico.¹ Under the Endangered Species Act (Act), as amended, it is the responsibility of the federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included in this document for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened.

Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

¹ Additional information about these species is available on the Internet at <http://nmrareplants.unm.edu>, <http://nrmnhp.unm.edu/bisonm/bisonquery.php>, and <http://ifw2es.fws.gov/endangeredspecies>.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U. S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish for information regarding fish and wildlife of State concern. Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. In future correspondence regarding this project, please refer to Consultation #2-22-05-I-0425. If you have any questions about the information in this letter, please contact Lyle Lewis at the letterhead address or 505-761-4714.

Sincerely,

A handwritten signature in cursive script that reads "Susan MacMullin".

Susan MacMullin
Field Supervisor

Enclosure

cc: (w/o enclosure)

Director, New Mexico Department of Game and Fish, Santa Fe, NM

FEDERAL ENDANGERED, THREATENED,
PROPOSED, AND CANDIDATE SPECIES
AND SPECIES OF CONCERN IN NEW MEXICO
Consultation Number 02-22-05-I-0425
June 24, 2005

San Juan County

ENDANGERED

Black-footed ferret (*Mustela nigripes*)**
Southwestern willow flycatcher (*Empidonax traillii extimus*)
Colorado pikeminnow (*Ptychocheilus lucius*), with critical habitat
Razorback sucker (*Xyrauchen texanus*), with critical habitat
Knowlton cactus (*Pediocactus knowltonii*)
Mancos milk-vetch (*Astragalus humillimus*)

THREATENED

Bald eagle (*Haliaeetus leucocephalus*)
Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat
Mesa Verde cactus (*Sclerocactus mesae-verdae*)

CANDIDATE

Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

Townsend's big-eared bat (*Corynorhinus townsendii*)
American peregrine falcon (*Falco peregrinus anatum*)
Arctic peregrine falcon (*Falco peregrinus tundrius*)
Baird's sparrow (*Ammodramus bairdii*)
Black tern (*Chlidonias niger*)
Mountain plover (*Charadrius montanus*)
Northern goshawk (*Accipiter gentilis*)
Western burrowing owl (*Athene cunicularia hypugea*)
Roundtail chub (*Gila robusta*)
New Mexico silverspot butterfly (*Speyeria nokomis nitocris*)
San Juan checkerspot butterfly (*Euphydryas anicia chuskae*)
San Juan tiger beetle (*Cicindela lengi jordai*)
Beautiful gilia (*Gilia formosa*)
Bisti fleabane (*Erigeron bistiensis*)
Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*)
Goodding's onion (*Allium gooddingii*)
Parish's alkali grass (*Puccinellia parishii*)
Santa Fe cholla (*Opuntia viridiflora*)

Index

Endangered =	Any species which is in danger of extinction throughout all or a significant portion of its range.
Threatened =	Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
Candidate =	Candidate Species (taxa for which the Service has sufficient information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities).
Proposed =	Any species of fish, wildlife or plant that is proposed in the Federal Register to be listed under section 4 of the Act.
Species of Concern =	Taxa for which further biological research and field study are needed to resolve their conservation status <u>OR</u> are considered sensitive, rare, or declining on lists maintained by Natural Heritage Programs, State wildlife agencies, other Federal agencies, or professional/academic scientific societies. Species of Concern are included for planning purposes only.
* =	Introduced population
** =	Survey should be conducted if project involves impacts to prairie dog towns or complexes of 200-acres or more for the Gunnison's prairie dog (<i>Cynomys gunnisoni</i>) and/or 80-acres or more for any subspecies of Black-tailed prairie dog (<i>Cynomys ludovicianus</i>). A complex consists of two or more neighboring prairie dog towns within 4.3 miles (7 kilometers) of each other.
*** =	Extirpated in this county
† =	May occur in this county from re-introductions in Colorado.



DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

July 31, 2006

078709

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section

Ms. Katherine Slick
State Historic Preservation Officer
New Mexico Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501



Dear Ms. Slick:

Pursuant to 36 CFR Part 800, the U.S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of "No Adverse Effect to Historic Properties" for a proposed rehabilitation of the Turley-Manzanares Acequia. The Corps, at the request of the New Mexico State Engineer/Interstate Stream Commission and the Turley-Manzanares Acequia Association, is planning the project under the Water Resources Development Act of 1986 (Public Law 99-662; 33 U.S.C. 2201 et. seq.), as amended. The project area is located near the village of Turley, San Juan County, New Mexico. Turley is located about 27 miles east of Farmington, New Mexico.

The proposed project would rehabilitate the existing diversion and install approximately 1,600 linear feet of pipeline and rock rip-rap along the south (left-hand) bank of the San Juan River. This upstream portion of the Turley-Manzanares Acequia is situated directly below a very steep Manzanares Mesa bluff from which rock falls continue to cause serious maintenance problems for the ditch association. The proposed new diversion structure will provide for easier diversion as well as the calibration and management of those irrigation water flows. Access to the project area is from, and staging areas are proposed for, both the north and south banks of the river.

On July 6, 2005, a Class III cultural resources survey of the project area, access roads and staging areas was conducted for the Corps by Western Cultural Resource Management, Inc. (WCRM). Enclosed for your review is the cultural resources survey report entitled **A Class III Cultural Resource Inventory of the Turley-Manzanares Acequia, Staging Areas, and Access Roads, San Juan County, New Mexico** (Report No. WCRM (F)324, NMCRIS No. 93927) and associated documentation prepared by WCRM. WCRM also documented the alignment of the ditch and other ditch features located downstream of the project area. The Turley-Manzanares Acequia system dates to 1876. No artifacts or other cultural resource manifestations other than the Turley-Manzanares Acequia system were observed during the cultural survey. WCRM recommends and the Corps concurs that the acequia system is potentially eligible for nomination to the National Register of Historic Places under Criteria c and d of 36 CFR 60.4. Upon further investigation, the local area may also be eligible for listing on the National Register as a rural historic landscape.

The acequia and its associated features have been rehabilitated numerous times in the past and the proposed rehabilitation would not adversely affect the acequia's alignment, form, nor its intended function, those historic elements that contribute to the acequia's eligibility for listing on the National Register. The access route to the project area north of the river crosses the Citizens Ditch, an acequia that is also National Register eligible. Utilizing the access road would have no effect to either the county road, the county road bridge, or to the Citizens Ditch. No prehistoric archaeological sites or other historic properties are known to occur within or in the immediate vicinity of the project area. American Indian Tribes with cultural resources concerns within the county have been contacted regarding the proposed rehabilitation; no traditional cultural properties are known to occur within or in the vicinity of the project area. The acequia rehabilitation project would have no effect to the local landscape. Based on the above and the information provided in the enclosed cultural survey report, the Corps, therefore, is of the opinion that the proposed Turley-Manzanares Acequia rehabilitation project would have "No Adverse Effect to Historic Properties."

Pursuant to 36 C.F.R. 800.11, should previously unknown artifacts or cultural resource manifestations be encountered during construction, work would cease in the immediate vicinity of the resource. A determination of significance would be made,

and a mitigation plan would be formulated in consultation with the New Mexico State Historic Preservation Officer and with American Indian Tribes that have cultural concerns in the area.

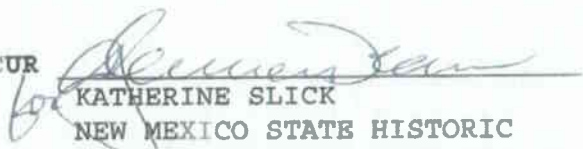
If you have questions or require additional information regarding the Turley-Manzanares Acequia rehabilitation project, please contact Mr. Gregory Everhart, archaeologist, at (505) 342-3352.

Sincerely,


Julie A. Hall
Chief, Environmental Resources
Section

30 Aug 2006
Date


I CONCUR


KATHERINE SLICK
NEW MEXICO STATE HISTORIC
PRESERVATION OFFICER

Enclosures

Copy Furnished (w/o enclosures):

Don Klima, Director
Office of Federal Agency Programs
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue, NW, Suite 809
Washington, D.C. 20004

 PLEASE PROVIDE COPIES
OF ORAL HISTORIES, PHOTODOCUMENTA-
TION, & ARCHIVAL RESEARCH TO
ARMS FOR CUMATION.

CESPA-OD-R (1145b)

MEMORANDUM FOR PM-LE

SUBJECT: Request for Jurisdictional Determination for the Turley-Manzanares Acequia Rehabilitation Project, San Juan County, New Mexico

1. Regulatory Background: Replacement directly in kind of existing structures is exempted from regulation under the maintenance exemption for Section 404 of the Clean Water Act. Irrigation structures are generally exempted from regulation.
2. In this particular instance, replacement of the heading structure, installation of the reinforced concrete pipe, and installation of the wire-wrapped gabion structures would not be a regulated activities due to the irrigation exemption.
3. Though the linear footage of wire-wrapped rip-rap is small, the impacts to the San Juan River in New Mexico due to hardscaped bank stabilization, including both authorized and unauthorized fill, are reaching cumulative from a Section 404 perspective. For future projects, Regulatory recommends other alternatives to the wire-wrapped rip-rap be examined that both provide reinforcement for the acequia as well as provide for more natural bank stabilization. Discussions with PM staff have indicated that the sponsor for this activity has a deep commitment to maintain the structure and that any failure of the wire-wrapped gabion structure would be promptly repaired.
4. This reach of the San Juan is considered habitat for bald eagles, southwestern willow flycatcher, and possibly Colorado pikeminnow. Regulatory recommends informal consultation with the US Fish and Wildlife Service regarding the proposed project's potential impacts to threatened and endangered species.

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APPENDIX B

Cultural Resources Survey Report

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Project No. 05F012
Report No. WCRM(F)324
NMCRIS No. 93927

New Mexico Annual Survey
Permit No. NM-05-062

**A CLASS III CULTURAL RESOURCE INVENTORY OF THE TURLEY-MANZANARES
ACEQUIA, STAGING AREAS, AND ACCESS ROADS,
SAN JUAN COUNTY, NEW MEXICO**

for

**Blue Earth Ecological Consultants, Inc.
1345 Pacheco Street
Santa Fe, New Mexico 87505
(505) 983-2687
(505) 983-2960 (Fax)**

and

**U.S. Army Corps of Engineers, Albuquerque District
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109
(505) 342-3352
(505) 342-3668 (Fax)**

by

**Nathan A. Pierantoni
and
Amie Gray**

submitted by

**Thomas J. Lennon
Principal Investigator**

**Western Cultural Resource Management, Inc.
2603 West Main St., Suite B
Farmington, New Mexico 87401
(505) 326-7420
(505) 324-1107 (Fax)**

April 28, 2006

ABSTRACT

On July 6, 2005, personnel from Western Cultural Resource Management, Inc. surveyed 8.65 acres of private land in Turley, San Juan County, New Mexico for Blue Earth Ecological Consultants, Inc., as part of the Turley–Manzanares Acequia Rehabilitation Project. The rehabilitation project has been undertaken by the U.S. Army Corps of Engineers at the request of the New Mexico Office of the State Engineer/Interstate Stream Commission and the Turley–Manzanares Acequia Association. One historic water delivery system was recorded. The Turley–Manzanares Acequia was recorded and photodocumented in its entirety, and archival research and oral interviews on the history of the acequia were completed. No additional sites were identified. The Turley–Manzanares Acequia is recommended eligible as a site within a rural historic landscape under criteria (c) and (d). For this project, no further cultural resource investigation is recommended for the Turley–Manzanares Acequia.

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INTRODUCTION

On July 6, 2005, Western Cultural Resource Management, Inc. (WCRM) conducted a Class III cultural resource inventory for Blue Earth Ecological Consultants, Inc. (Blue Earth) as part of the Environmental Assessment for the Turley–Manzanares Acequia Rehabilitation Project near Turley, New Mexico (Figure 1). The intensive pedestrian survey targeted 526 m (1,726 ft) of the uppermost portion of the Turley–Manzanares Acequia, two access roads, and two staging areas for a total of 8.65 acres (Figure 2). WCRM also recorded and photodocumented the 4.5 km (2.8 mi) length of the acequia (see Figure 2). Communication with Native American groups was initiated to identify traditional cultural properties that may exist. Research into the history of construction, modification, and use of the Turley–Manzanares Acequia was also conducted by WCRM.

The project was administered for Blue Earth by Karen Yori, and for WCRM by Charles W. Wheeler. WCRM personnel Nathan Pierantoni, Rheagan Alexander and Rebecca Rackley completed the survey under New Mexico Annual Survey Permit No. NM-05-062. The entire project was located on private land.

The Water Resources Development Act (WRDA) of 1986 (P.L. 99-662) authorized the restoration and rehabilitation of irrigation ditch systems and acequias in New Mexico. Congress has found that New Mexico's acequias date from the eighteenth century and, due to their significance in the settlement and development of the western United States, should be restored and preserved for their cultural and historic values to the region. The Secretary of the Army, therefore, has been authorized and directed to undertake, without regard to economic analysis, such measures as are necessary to protect and restore New Mexico's acequias. Under Section 1113 of WRDA, the Albuquerque District of the U.S. Army Corps of Engineers (COE), at the request of the State Engineer and Turley–Manzanares Acequia, is providing assistance to reconstruct the water control structure that manages flow into the system.

PROJECT DESCRIPTION

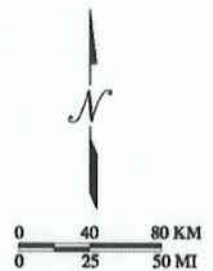
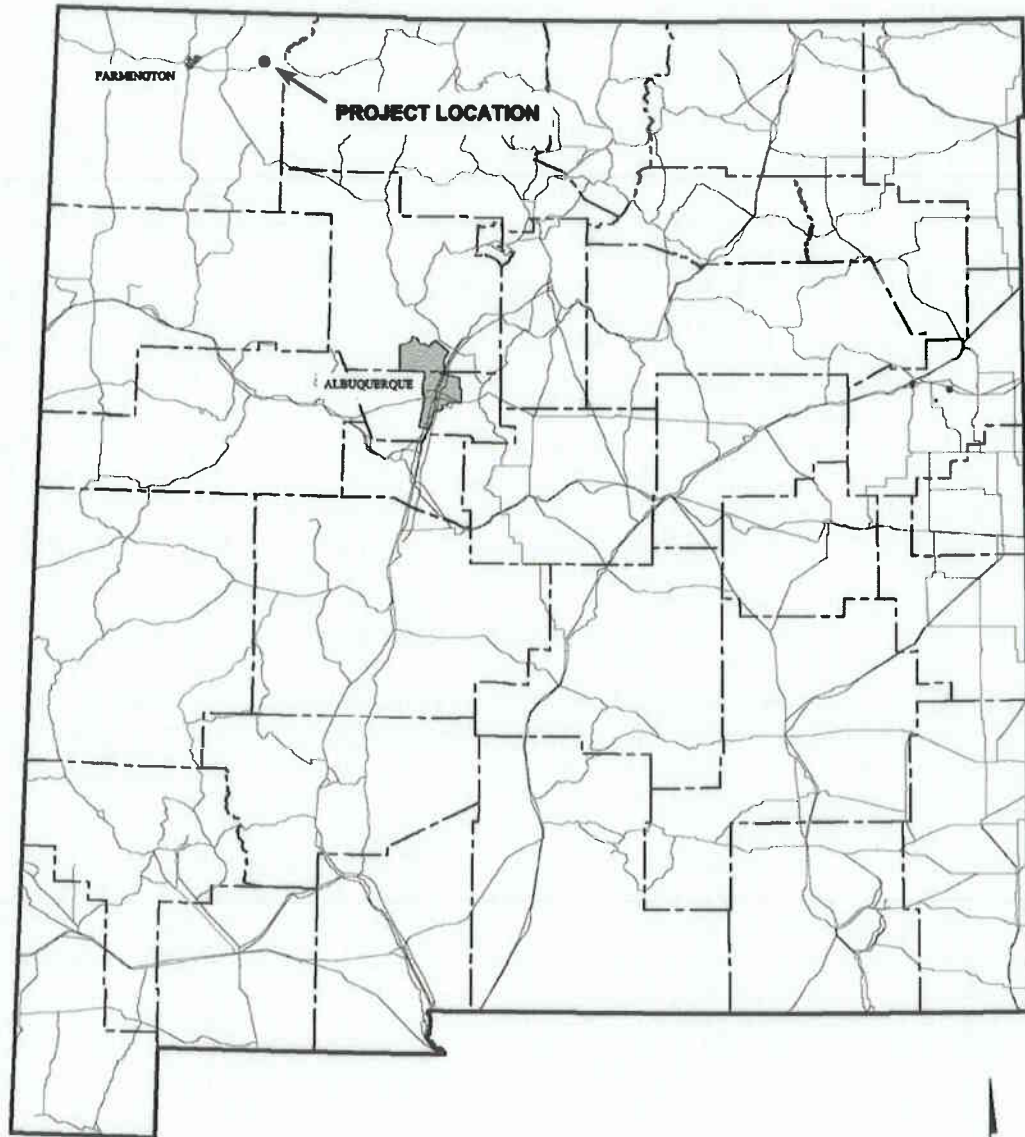
The project is located near the village of Turley, on the San Juan River, in San Juan County, New Mexico. The legal location of the project area covered during the cultural resource inventory is summarized in Table 1. In summary, the project involves rehabilitation of the upper portion of the Turley–Manzanares Acequia (see Figure 2).

The intensive pedestrian survey included two access roads and two staging areas, as well as the acequia. Access Road 1 was located on the northern side of the river. It was 1.3 km (0.8 mi) long, and approximately 9.1 m (30 ft) wide. At the eastern end of Access Road 1, Staging Area 1 was surveyed. Staging Area 1 was a square block that measured 45.7 x 45.7 m (150 x 150 ft) and was located at the northern edge of the San Juan River. Access Road 2 was located on the southern side of the river and was 221 m (725 ft) long and approximately 9.1 m (30 ft) wide. Staging Area 2 was located at the northern end of Access Road 2 and measured 60.1 x 30.5 m (200 x 100 ft). A 7.6 m (25 ft) buffer was surveyed at both edges of Access Roads 1 and 2. A 15.2 m (50 ft) buffer was surveyed at the eastern and western edges of Staging Areas 1 and 2.

The existing system for delivering water is difficult and costly to operate and maintain. General project components include: 1) replacing the existing heading structure with either a gated heading or an inflatable bladder dam with a split weir; 2) installing 1,600 linear feet of 36-inch reinforced concrete pipe; and 3) placing wire-wrapped riprap along 1,600 feet of the riverside embankment. In addition, the proposed project plans to rehabilitate three features on the acequia.

TURLEY-MANZANARES ACEQUIA REHABILITATION NEW MEXICO PROJECT LOCATION MAP

----- COUNTY BOUNDARY ————— MAJOR HIGHWAY



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Figure 1. Project location map.

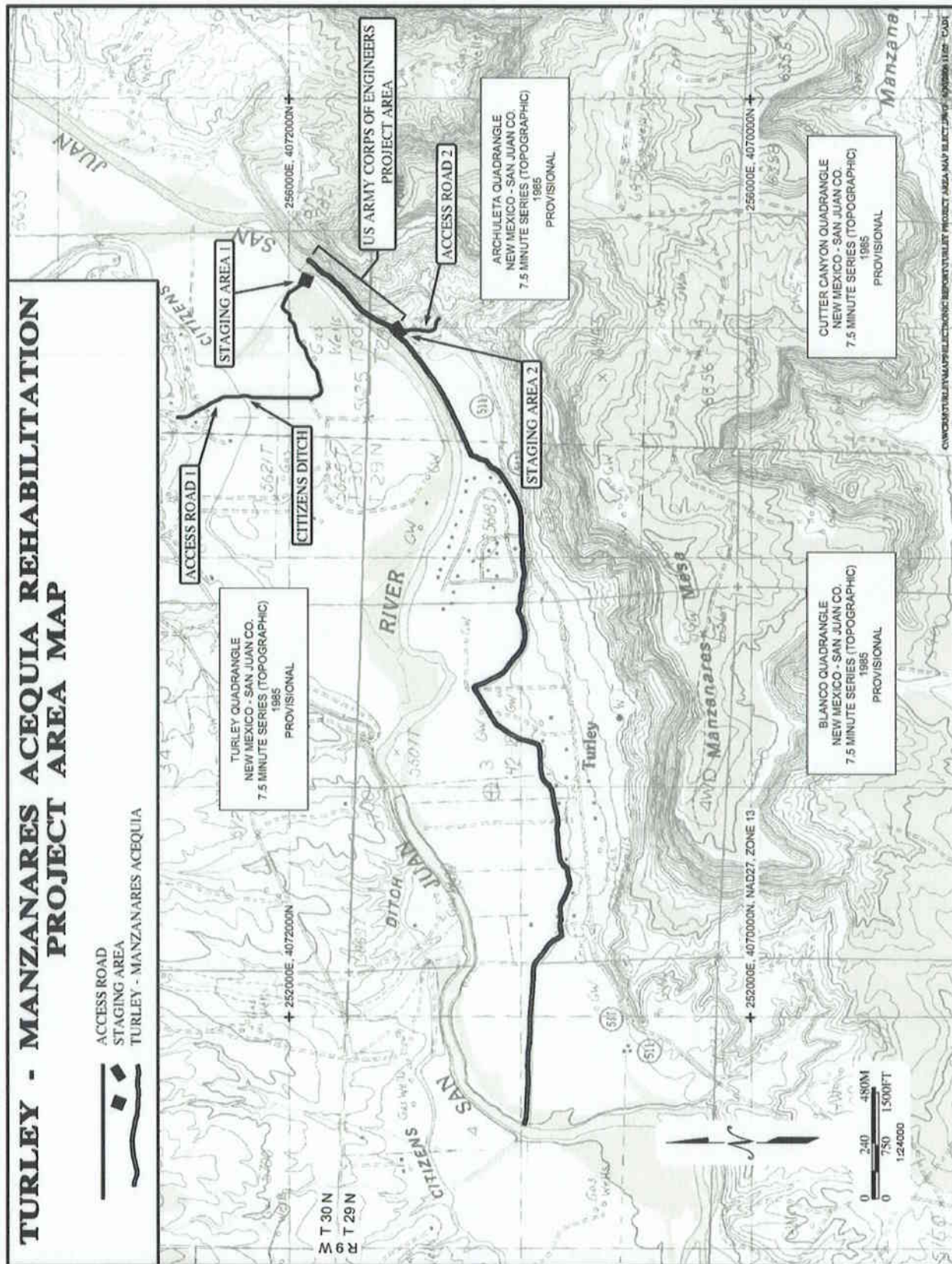


Figure 2. Project area map.

Table 1. Legal Description of the Proposed Project Area.

USGS Quadrangle	Township	Range	Section*	Quarter-quarter-quarter
Archuleta, NM 1985	30 N	9 W	35	SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$, W $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$
	29 N	9 W	2	NE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$
Turley, NM 1985	29 N	9 W	2	SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$
	29 N	9 W	3	S $\frac{1}{2}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$, W $\frac{1}{2}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$, N $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$
	29 N	9 W	4	S $\frac{1}{2}$ S $\frac{1}{2}$ NE $\frac{1}{4}$

*Template anchored on southeastern corner and southern edge of section

ENVIRONMENT AND SETTING

The project is located within the San Juan Basin and runs along the Turley–Manzanares Acequia near and through Turley, New Mexico. Sediments exposed at the site were typical of alluvial flood plain deposits, with alternating strata of alluvial clays and sands. Vegetation in the project area was primarily composed of Russian olive, cottonwood, and various wildflowers and cacti, including cholla and prickly pear. Along the San Juan River, the natural cottonwood riparian community is still present.

CULTURAL HISTORY

This section presents a brief overview of the prehistory and history of the San Juan Basin. It is adapted from Gilpin et al. (1984); Freuden et al. (1994); and Baker (2001).

Paleoindian Period (9500-5500 B.C.)

The Paleoindian period represents the earliest documented presence of human populations in the New World. In the San Juan Basin, the Paleoindian period dates from roughly 9500 to 5500 B.C. Paleoindian presence is represented by specific projectile point types found as isolated artifacts or with associated scatters of flaked lithic artifacts. The nature of the Paleoindian occupation in the San Juan Basin is poorly understood, and is envisioned as consisting of small bands of transitory hunters whose primary focus was the procurement of Pleistocene megafauna. The subsistence base presumably also included smaller game and gathered plant resources. Documented Paleoindian sites are infrequent in the San Juan Basin and occur along dunes and ridges above the valley bottoms (Vivian 1990; Cordell 1982a; Dulaney and Dosh 1981; Hadlock 1962).

Archaic Period (5500 B.C. – A.D. 1)

The shift to a more diverse subsistence base signals the advent of the Archaic period, which lasts from roughly 5500 B.C. to A.D. 1. Deer, pronghorn, and bighorn sheep replaced the megafauna of the Paleoindian period, and were supplemented by a greater extent than in the Paleoindian period by small game and plant resources. Diagnostic projectile points and distinctive aceramic assemblages characterize Archaic sites. Hearths and fire-cracked rock are found in abundance (Cordell 1982a). Ground stone

tools, specifically milling stones and handstones, appear during the Archaic period, reflecting the change toward greater reliance on plant resources; hard seeds and, later, pinyon nuts became important food resources. The Archaic period was initially identified in the northern Southwest in the late 1930s to early 1940s.

Based on work in the Arroyo Cuervo region of the Rio Puerco Valley at the southeastern edge of the San Juan Basin, Irwin-Williams (1973) defined the Oshara tradition and devised a phase sequence that represents successive adaptations to the changing environment. These include Bajada, San Jose, Armijo, and En Medio Archaic phases. The adaptive changes included the possible addition of limited maize agriculture to the subsistence base during the Armijo phase and a gradual continuum through the Late Archaic-Basketmaker II transition (En Medio phase), culminating with the agriculturally oriented sedentary prehispanic Pueblo (Anasazi) and the Trujillo (A.D. 400-600), Sky Village (A.D. 600-700), and Loma Alta (A.D. 700-850) phases of the Oshara tradition (Irwin-Williams 1973).

Surveys since 1957 have documented an abundance of Archaic sites in the San Juan Basin (Judge 1982; Kearns et al. 1991; Burchett et al. 1994). Archaic sites appear to cluster in the northern San Juan Basin, Chaco Canyon region, and Arroyo Cuervo region; whether this pattern is due to locations of surveys, erosion and deflation associated with the sand dune topography of these areas, or to actual association of sites with these specific areas based on resources remains to be seen (Judge 1982).

Formative Period (A.D. 1-1300)

The Formative period is represented by the Anasazi occupation on the Colorado Plateau. It is characterized by an agricultural subsistence base, sedentary to semisedentary settlement pattern, and the introduction of ceramics into the assemblage.

The Pecos Classification, developed by Kidder (1927), is the most widely used scheme for ordering Anasazi prehistory. Several temporal frameworks have been devised for the San Juan Basin. The following discussion utilizes the temporal sequence assigned to the Pecos Classification primarily as a result of investigations during the Chaco project in Chaco Canyon (Judge 1991).

Basketmaker II (A.D. 1-450)

The Basketmaker II period represents the transition from the mobile, hunter-gatherer lifeway of the Archaic to the increasingly sedentary, agriculture-based lifeway that fully manifests itself in later Pueblo times. The Basketmaker II period (roughly A.D. 1-450) corresponds to the latter part of the Archaic, overlapping with the Oshara tradition En Medio phase. The Basketmaker II period is also synchronous with the Los Pinos phase, as identified in the Navajo Reservoir District by Dittert et al. (1961) and Eddy (1961, 1966).

Basketmaker III (A.D. 450-700)

The Basketmaker III period is signaled in the San Juan Basin and elsewhere by the appearance of beans, true pithouses with antechambers, and gray ware ceramics. Basketmaker III sites typically include between one and three pithouses (sometimes slab lined), several slab-lined storage cists, and, in the Chuska Valley, one or more slab-lined storage rooms (Watson 1987). Basketmaker III sites are often found on ridges and bluffs near river valleys, reflecting the increasing importance of agriculture in the Basketmaker subsistence strategy.

Pueblo I (A.D. 700-900)

Pueblo I occupation is generally represented by small, sedentary villages utilizing wild and domesticated plant resources (Plog and Wait 1982). The Pueblo I period is marked by the construction of surface structures for habitation and storage. Surface rooms are built of jacal with slab footings. Pit structures are still present. They are typically deeper than the Basketmaker III forms, and they begin to acquire the characteristics typical of later kivas. Antechambers are replaced by a ventilator system. By the latter part of the period, sites frequently consist of a single or double row of contiguous masonry or slab-lined habitation rooms forming a C shape, partially enclosing a kiva. Plazalike work areas are occasionally present. Neck-banded pottery and slipped wares appear during the Pueblo I period, and cotton is found in some areas.

Pueblo II (A.D. 900-1050)

The Pueblo II period is a time of Anasazi cultural florescence in the San Juan Basin. The Pueblo II period lasts roughly from A. D. 900 to 1050 in Chaco Canyon and vicinity (Judge 1991). Settlement density and population escalated as agricultural practices expanded and became more complex. Chaco Canyon, Chuska Valley, Red Mesa Valley, and the La Plata/Animas/San Juan River valleys are areas of high site concentrations during this period (Cordell 1979a; Morris 1939; Plog and Wait 1982).

Many Pueblo II sites are located along rivers or drainages, reflecting agricultural dependence. Many small Pueblo II sherd and lithic artifact scatters in the San Juan Basin represent temporary camps, resource processing locales, or residue from agricultural activities. As in other Pueblo periods, ceramics are used as temporal markers within local phase schemes. Design styles change during the Pueblo II period, and corrugated utility wares are developed.

Pueblo III (A.D. 1050-1300)

The Pueblo III period begins about A.D. 1050 and continues until the general abandonment of the Four Corners region by roughly A.D. 1300. The early Pueblo II period in the San Juan Basin appears to have been strongly influenced by Chaco Canyon. A period of heightened construction activity took place between A.D. 1050 and 1140, at which point the canyon and its environs were apparently abandoned for at least a century (Judge 1991; Lekson 1991). The ensuing occupation by peoples from the Mesa Verde area was followed by complete abandonment of the canyon and the San Juan Basin.

Pueblo III sites are evenly distributed across the basin, with community concentrations in Chaco Canyon, the La Plata/Animas/San Juan River valleys, Lobo Mesa, and in the Chuska Valley (Cordell 1982b; Plog and Wait 1982). By about A.D. 1300, the Mesa Verde population had essentially abandoned the San Juan Basin and the surrounding area.

Pueblo IV (A.D. 1300-1540)

The Pueblo IV period extends from A.D. 1300 to the arrival of the Spanish in 1540 (Kidder 1927). Population shifts following the abandonment of the San Juan Basin involved the dramatic expansion of population and establishment of new communities along the Rio Grande valley in northern New Mexico, south of the San Juan Basin in the Zuni area, along the Little Colorado River in Arizona, and on the Hopi mesas in northeastern Arizona (Cordell 1979b; Brew 1979). Early components at Zuni and associated sites such as Heshotauthla, Kechipauan, and Hawikuh constitute the Pueblo IV manifestations nearest the project area.

Pueblo V (A.D. 1540-present)

The Pueblo V period begins with initial contact with the Spanish in A.D. 1540 and extends to the present. Zuni Pueblo south of Gallup represents the closest Pueblo V occupation to the project area.

Navajo

The name Navajo comes from "Nabaju," a seventeenth century Spanish rendering of a Tewa term meaning "great planted fields." The term was used to characterize the "farmer Apaches" living in northwestern New Mexico (Kelley 1982). Navajo history has been characterized by a continuing struggle for land and by social changes brought about by contact with other cultural groups.

By A.D. 1500, the first Athapaskans, presumed to be ancestral to the modern Navajo, had arrived in the northern San Juan Basin. Based on oral tradition and some similarities in house type, some Navajo believe that the Anasazi included the Navajo. This period of early Navajo occupation is referred to as the Dinétah phase (Dittert et al. 1961). Dinétah phase populations were primarily nomadic hunter-gatherers. It is not known exactly when or how agricultural practices were adopted, but archaeological evidence of maize at Navajo sites dates to the sixteenth century (Bailey and Bailey 1982; Hogan et al. 1991).

The Dinétah, or traditional Navajo heartland, is in the Navajo Reservoir, Gobernador Canyon, and Largo Canyon areas of northwestern New Mexico. Dinétah phase sites are known from the La Plata Valley (Hancock et al. 1988; Reed et al. 1988) and from the Navajo Reservoir District (Dittert et al. 1961). From the northern basin, the population gradually spread southward (Hester 1962).

The Gobernador phase follows the Dinétah phase and dates from the Spanish reconquest of New Mexico from A.D. 1680 to 1780 (Bailey and Bailey 1978:10; Dittert et al. 1961). During the Gobernador phase, masonry architecture and painted pottery appear. Small, defensive "pueblitos" were constructed in Largo Canyon and Gobernador Canyon areas in response to threats from the Utes and Comanches. The distinctly Navajo culture of today emerged during this period. Livestock herding was adopted and a diverse settlement pattern evolved (Kelley 1982).

Contact with Euroamericans during the eighteenth and nineteenth centuries consisted of some trade, raiding, and missionary work. Land disputes were carried on with the Spanish and Mexican governments. Raiding of Euroamerican settlements in New Mexico and Arizona during the 1800s precipitated the subjugation and confinement of many Navajo to Fort Sumner, New Mexico in 1864. The period of incarceration was brought to an end in 1868, and the Navajo Indian Reservation was established. During the latter half of the nineteenth century and continuing today, activities such as ceramic manufacture, silversmithing, and weaving, along with wage labor, became means of raising money for participation in a cash economy.

The Depression of the 1930s, combined with the reduction of sheep herds as the result of overgrazing legislation passed during the same decade, led to a decrease in sheepherding and an increase in dependence on wage labor.

Historic Euroamerican

Until the late nineteenth century, the Euroamerican population of northwestern New Mexico was limited to a few traders, missionaries, Indian agency representatives, and ranchers. Bloomfield and other settlements along the San Juan River, including Turley, were established as farming and ranching communities in the 1870s. Timber harvesting for railroad and construction of the railroad through Gallup in 1881 drew loggers and railroad workers to that area. Coal mining was initiated in the same year,

causing an influx of mine workers and the growth of large, company-owned mining camps. Oil and gas reserves began to be developed in the 1950s.

FILE SEARCH

A file search was conducted prior to initiating fieldwork to be able to anticipate previously recorded cultural properties. These were conducted at the New Mexico Historic Preservation Division at the Laboratory of Anthropology, Archeological Records Management Section (ARMS), from a remote station. Cultural properties lists of the National Register of Historic Places (NRHP) and State Register of Cultural Properties (SRCP) were also investigated. Access Road 1 was discovered to cross Citizens Ditch. Though it had been previously recorded in other locations prior to standards issued by the State Historic Preservation Officer (SHPO), Citizens Ditch was not recorded here because current procedures are to record only nonfunctioning acequia systems or segments (SHPO 1999). Citizens Ditch was previously recorded under site numbers LA 99826, LA 100341, LA 107469 (Brabant 1995; Brown and Brown 2004; Hancock 1993; Johnson et al. 1993; Marshall 1994). No other previously recorded sites were in the vicinity of the Turley–Manzanares Acequia.

METHODS

Topographic maps were prepared prior to fieldwork. During the survey, access road and staging area locations as well as features encountered along the acequia were recorded in NAD 27 using a Magellan 330 WAAS-enabled GPS unit with an accuracy of 3-10 m (9.8-32.8 ft) under most conditions. AutoDesk Map 6 and ArcMap 9.0 were used to plot these points on 250 dpi DRGs (digital raster graphics) derived from AllTopo V7 software and on one-meter (3 ft) resolution black-and-white orthophotos downloaded from Terraserver.com and reprojected to NAD 27 to match the DRGs.

A Class III cultural resource inventory of the project area, including 526 linear meters (1,725 ft) of the Turley–Manzanares Acequia, two staging areas, and two access roads, for a total of 8.65 acres, was completed on July 6, 2005. The inventory was completed by pedestrian zigzag transects spaced no more than 15 m apart. The survey was not limited to the COE project area. The full length of the Turley–Manzanares Acequia, 4.5 km (2.8 mi), was recorded and photodocumented to identify existing features. UTM locations of key elements were recorded via handheld GPS units. In addition, eligibility in terms of a rural historic landscape was considered.

Historical research was completed regarding the history of construction, modification, and use of the Turley–Manzanares Acequia. Data were sought from existing aerial photographs (USGS), the acequia association, the Office of the State Engineer in Aztec, New Mexico, the Natural Resources Conservation Service, and Bureau of Land Management General Land Office maps.

Ground visibility within the project area varied from 100 percent in areas devoid of vegetation or with sparse grasses to 0 percent in areas covered with Russian olive and various grasses. Despite the difficulty of transecting in these thickets, survey was conducted through them, as cultural resources are often protected, and obscured, by this kind of vegetative growth.

Because the cultural resource encountered is an in-use linear feature, it was recorded using a New Mexico Historic Water Delivery Systems Inventory Form (Appendix A). Photographs in black and white and color were taken of the site.

RESULTS

Survey of Staging Areas 1 and 2 resulted in the discovery of no cultural materials. Survey of Access Road 2 also yielded no cultural material. Access Road 1 crossed the Citizens Ditch via a bridge

constructed in the 1970s (Carroll Crawford, Bloomfield Irrigation District Commissioner; personal communication April 2006). No additional cultural material was encountered during the survey of Access Road 1. Sixteen features were identified along the entire length of the Turley–Manzanares Acequia. Three features were recorded within the COE project area, and 13 were recorded outside the COE project area. Discussion of this historic water delivery system is included below. In addition, results of archival research for the Turley–Manzanares Acequia are presented. No comments on the project were received from the Native American community.

Turley–Manzanares Acequia

The Class III cultural resource inventory along the upper 526 m (1,726 ft) encountered no additional cultural materials or properties. Sixteen features associated with the acequia were documented (Figure 3). Three of the features (1-3) were in the COE project area, and 13 (4-16) were outside the COE project area. The Turley–Manzanares acequia is maintained by the community acequia association (Pat Montoya, mayordomo; personal communication April 2006).

The west-flowing acequia extended for a total length of 4.5 km (2.8 mi). The upper 526 m (1,726 ft) were adjacent to the southern bank of the San Juan River. The acequia was contained by a berm of boulders, rubble, and dirt that have been placed within the river to direct the water flow. The berm averaged 3.5 m (11.5 ft) in width. At the uppermost portion of the acequia, the canal was approximately 8 m (26.2 ft) wide. The canal gradually decreased in width and water flow along the length of the acequia until it narrowed to 3 m (9.8 ft) at the location of Feature 4. Throughout the lower 4 km (2.5 mi) of the acequia, the canal averaged 2 m (6.6 ft). The lower part of the acequia diverged from the river and followed a westward course through the agricultural land of Turley, New Mexico. At the western end of Turley, the acequia returned to the river at Feature 16. The lower portion of the acequia is characterized by an excavated ditch confined by a low earthen berm that measured between 0.5 and 1.0 m (1.6 to 3.3 ft) in width.

The recorded features included one diversion dam, six drains, seven culverts, a drop and culvert, and the river return (Table 2). Lateral gates were referred to as drains by the acequia users and are referred to as drains in this report. Features were numbered from east to west.

Table 2. Features along the Turley–Manzanares Acequia.

Feature No.	Feature Type	UTM (Zone 13); NAD 1927	
		Easting	Northing
1	Diversion dam	255039	4071992
2	Drain	255245	4071867
3	Drain	255039	4071627
4	Culvert	254981	4071540
5	Drain	254886	4071453
6	Drain	254618	4071282
7	Culvert	254414	4071135
8	Culvert	254085	4070997
9	Drain	253779	4071011
10	Drain	253515	4071066
11	Culvert	253434	4071186
12	Culvert	253335	4071136
13	Culvert	253217	4071013
14	Culvert	252453	4070822
15	Drop and culvert	252399	4070829
16	River return	251535	4070982

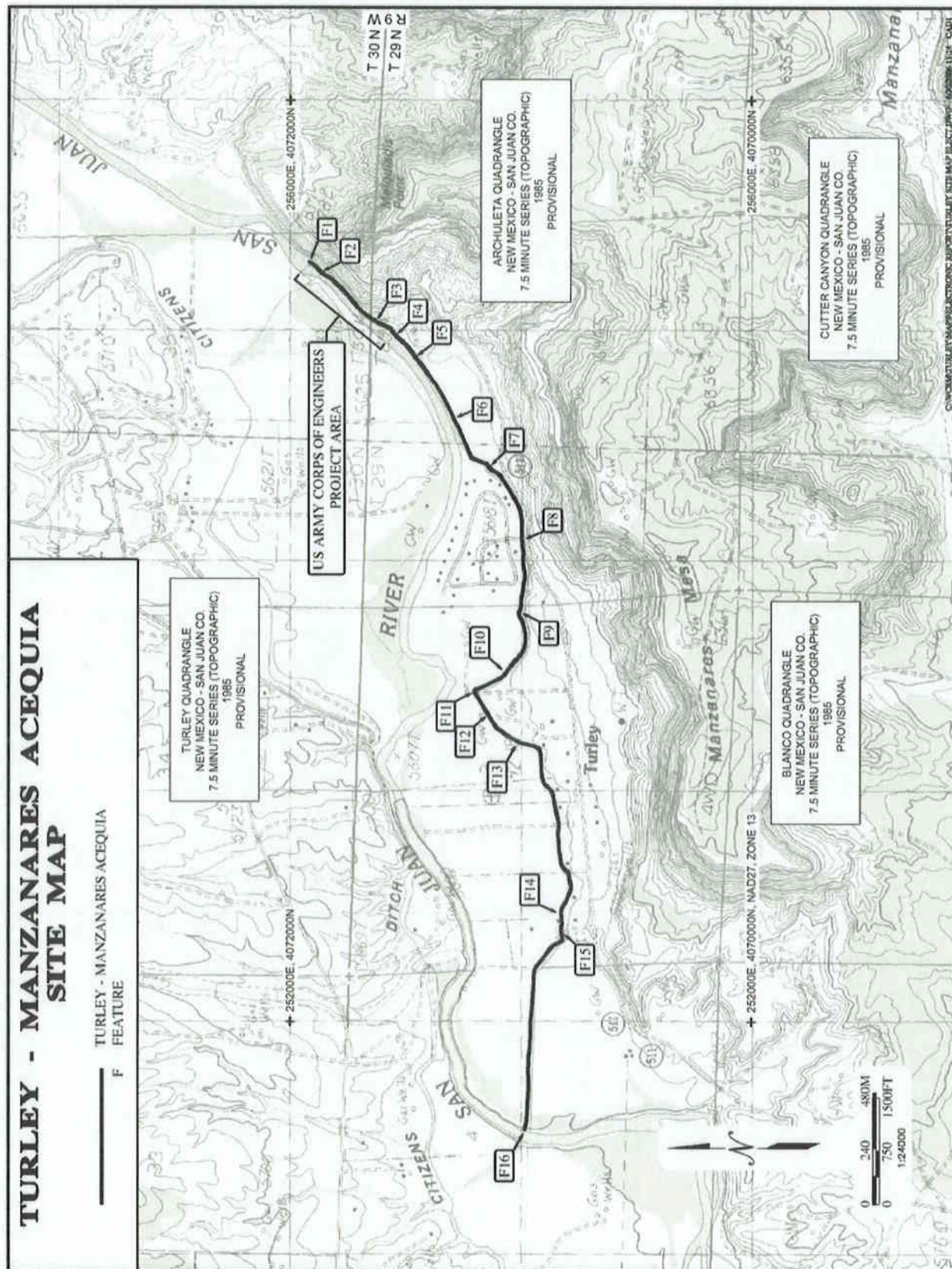


Figure 3. Turley-Manzanares Acequia site map.

Feature 1 was the diversion dam that directed the San Juan River into the canal at its eastern end (Figure 4). The diversion dam was constructed in 1876 (Pat Montoya, personal communication 2006). It was constructed of approximately 12 boulders, each averaging 1.8 m (6 ft) in diameter. Rubble was present among the boulders, though it was evident that high river levels had necessitated reconstruction throughout the use period of the dam. At the northernmost point of the dam, two concrete barricades were present. The diversion dam was situated at a 45-degree angle to the flow of the river, and extended approximately 15.25 m (50 ft) to a point about midway in the river. Rehabilitation of the acequia is expected to impact Feature 1.

Feature 2 was a drain constructed of concrete and wood to allow overflow from the canal to spill back into the river. The drain was constructed prior to 1953 (Pat Montoya, personal communication 2006). Feature 2 consisted of two five-foot-long concrete walls of unknown height, perpendicular to the canal on its northern edge (Figure 5). The 42-inch gap between the walls was dammed by at least five 2 x 6 inch boards, which could be added or removed to adjust the level of water in the canal. On the northern side of the canal, a third five-foot-long concrete wall of unknown height was present. It served to retain the bank in the vicinity of the drain. Rehabilitation of the acequia is expected to impact Feature 2.

Feature 3 was a drain constructed of concrete, steel plate, and steel pipe (Figure 6). The drain was constructed prior to 1953 (Pat Montoya, personal communication 2006). The steel plate was placed so that it could be raised and lowered, thus adjusting the water level in the canal. Two upright steel posts supported a cross member attached to a steel wheel 40 inches in diameter and two inches wide from a hay rake. The wheel was installed in the last 10 years (Pat Montoya, personal communication 2006). When the wheel was turned, steel cables attached to the cross member would raise the drain gate/plate to allow water and sediment to return to the river. The entire structure was supported by a concrete retaining wall. Rehabilitation of the acequia is expected to impact Feature 3.

Feature 4 was a corrugated steel culvert that spanned the width of a road that crossed the acequia (Figure 7). The culvert was constructed after 1953 (Pat Montoya, personal communication 2006). It was approximately 42 inches in diameter and 20 ft in length. The flow of the canal was directed into and guided out of the culvert by wooden retaining walls supported by steel pipes. The retaining walls were each 6 ft long and comprised of 2 x 6 inch boards. The boards stretched from the edge of the acequia to the opening of the culvert and were positioned at a 45-degree angle to the canal.

Feature 5 was a drain similar to Feature 3 (Figure 8). The drain was constructed prior to 1953 (Pat Montoya, personal communication 2006). The steel wheel was of the same type as the wheel in Feature 3 and was installed in the last 10 years (Pat Montoya, personal communication 2006). The drain was constructed to allow water and sediment to return to the river.

Feature 6 was a drain similar in construction to Feature 3 (Figure 9). The drain was constructed prior to 1953 (Pat Montoya, personal communication 2006). The steel wheel was of the same type as the wheel in Feature 3. This wheel was installed by members of the acequia association within the last 10 years (Pat Montoya, personal communication 2006). The drain was constructed to allow water and sediment to return to the river.

Feature 7 was a culvert constructed of 36-inch-diameter corrugated steel pipe (Figure 10). The culvert was constructed after 1953 (Pat Montoya, personal communication 2006). It conveyed water beneath a two-track road. The length of the culvert was approximately 7 ft.



Figure 4. Turley-Manzanares Acequia, Feature 1, diversion dam, photo facing north.
Water flows into acequia to right of dam (July 6, 2005).



Figure 5. Turley-Manzanares Acequia, Feature 2, drain, photo facing south (July 6, 2005).



Figure 6. Turley-Manzanares Acequia, Feature 3, hay rake-wheel drain, photo facing north.
Note San Juan River in background (July 6, 2005).



Figure 7. Turley-Manzanares Acequia, Feature 4, culvert, photo facing west (July 6, 2005).



Figure 8. Turley-Manzanares Acequia, Feature 5, hay rake-wheel drain, photo facing north (July 6, 2005).



Figure 9. Turley-Manzanares Acequia, Feature 6, hay rake-wheel drain, photo facing north (July 6, 2005).



Figure 10. Turley–Manzanares Acequia, Feature 7, culvert, photo facing north (July 6, 2005).

Feature 8 was a culvert constructed of 36-inch-diameter corrugated steel pipe (Figure 11). The culvert was constructed after 1953 (Pat Montoya, personal communication 2006). It conveyed water beneath County Road 4399. The length of the culvert was approximately 20 ft.

Feature 9 was a drain similar in construction to Feature 3 (Figure 12). The drain was constructed prior to 1953 (Pat Montoya, personal communication 2006). It had a steel wheel attached to a cross member to control water flow. The wheel was installed in the last 10 years (Pat Montoya, personal communication 2006). Feature 9 released water into a smaller lateral that watered the adjacent farmland.

Feature 10 was a drain similar in construction to Feature 3 (Figure 13). The drain was constructed prior to 1953 (Pat Montoya, personal communication 2006). It had a steel wheel attached to a cross member to control water flow. The wheel was installed in the last 10 years (Pat Montoya, personal communication 2006). Feature 10 released water into a smaller lateral that watered the adjacent farmland.

Feature 11 was a culvert constructed of 36-inch-diameter corrugated steel pipe (Figure 14). The culvert was constructed after 1953 (Pat Montoya, personal communication 2006). It conveyed water beneath the driveway of the adjacent vineyard. The length of the culvert was approximately 12 ft.

Feature 12 was a culvert constructed of 24-inch-diameter corrugated steel pipe (Figure 15). The culvert was constructed after 1953 (Pat Montoya, personal communication 2006). It conveyed water beneath a road. The length of the culvert was approximately 8 ft.



Figure 11. Turley-Manzanares Acequia, Feature 8, culvert, photo facing northwest (July 6, 2005).



Figure 12. Turley-Manzanares Acequia, Feature 9, hay rake-wheel drain, photo facing south (July 6, 2005).



Figure 13. Turley–Manzanares Acequia, Feature 10, hay rake-wheel drain, photo facing south (July 6, 2005).

Feature 13 was a culvert constructed of 24-inch-diameter corrugated steel pipe (Figure 16). The culvert was constructed after 1953 (Pat Montoya, personal communication 2006). It conveyed water beneath a road. The length of the culvert was approximately 8 ft.

Feature 14 was a culvert constructed of 24-inch-diameter corrugated steel pipe (Figure 17). The culvert was constructed after 1953 (Pat Montoya, personal communication 2006). It conveyed water beneath the driveway of the adjacent house. The length of the culvert was approximately 6 ft. At each end of the culvert, concrete walls were in place to hold the overlying sediments that comprised the driveway.



Figure 14. Turley-Manzanares Acequia, Feature 11, culvert, photo facing west (July 6, 2005).



Figure 15. Turley-Manzanares Acequia, Feature 12, culvert, photo facing west.
Note modern construction of small culvert on right (July 6, 2005).



Figure 16. Turley-Manzanares Acequia, Feature 13, culvert, photo facing west (July 6, 2005).



Figure 17. Turley-Manzanares Acequia, Feature 14, culvert, photo facing east (July 6, 2005).

Feature 15 was a drop and culvert (Figure 18). The drop was constructed prior to 1953; the culvert has been replaced since then (Pat Montoya, personal communication 2006). Drops were constructed to permit rapid changes in the elevational gradient of water in a ditch while minimizing canal erosion (Ackerly 1996). The drop was connected to a culvert constructed of corrugated steel pipe, which carried water underneath the adjacent road.

Feature 16 was the river return. The point at which the canal returned to the San Juan River was characterized by a deliberate cut in the riverbank (Figure 19). No construction elements were present. At its point of return, the acequia was approximately 4 ft wide.

Archival Research

Archival research was completed for the Turley-Manzanares Acequia to assess its eligibility for nomination the NRHP as a site within a rural historic landscape. The term "landscape" has a wide range of meaning in natural, cultural, and social research, from "a picture of natural inland scenery" to "a composition of man-made or man modified spaces to serve as infrastructure or background for our collective existence" (Benally 2005). Local history plays an important role in the determination of eligibility. Below is the cultural construction of the history of the Turley-Manzanares Acequia and the people who used it.

Hispanic families from Tierra Amarilla and Santa Fe, New Mexico, and the San Luis Valley in Colorado established communities along the upper San Juan. The first settlement, the Manzanares Community in the present area of Turley, was established in 1875-1876. Some of the early Hispanic colonizers were the "Manzonares [sic], Pacheco, and Archuleta families, and the families of J. T. and Salome Jacquez, David E. Lobato, and Manuel Sanchez" (Duke 1947:23). They quickly built a church, and the area around it became known as Alcatraz, which was located along the northwestern bank of the San Juan River. In the late 1880s, however, the colony moved to a higher elevation on the more favorable southern side of the river and was renamed Turley (Duke 1947:23), in honor of Jay Turley, an engineer who was first to envision harnessing the San Juan River (Waybourn 2001). From the early occupation of Turley, Hispanics expanded both up and down the river and founded the present-day hamlets of Blanco and Archuleta.

The Turley-Manzanares Acequia holds the oldest priority date (1876) on the San Juan River (J. L. Sizemore, Office of the State Engineer, to C. DeAngelis, Bureau of Reclamation, letter, 6 July 2000, Santa Fe, New Mexico [Sizemore 2000]). Acequias found in the Southwest represent a unique solution to overcome problems associated with dryland farming.

Adjudicated rights of the earliest ditch users were not available for research. The adjudicated rights in Case No. 01690, District Court, San Juan County, New Mexico (also known as the 1948 Echo Ditch Decree) indicate that in 1948, the community of Turley was still dependent on the water that the acequia brought to its lands. Thirteen members of the community acequia association are listed in the records, and many appear to be descendants of the original settlers to the area. The Lobato and Archuleta families are represented, as well as the Gutierrez and Chavez families. In addition, the Catholic Church is included in the adjudication, as it maintained farmland. The adjudication also indicates crops under irrigation, including alfalfa, beans, corn, and grains.



Figure 18. Turley-Manzanares Acequia, Feature 15, drop and culvert, photo facing west (July 6, 2005).



Figure 19. Turley-Manzanares Acequia, Feature 16, river return, photo facing west. Note San Juan River in background (July 6, 2005).

Construction elements identified as features during the survey indicate that the acequia had been modified during its lifetime. The drains constructed of wood and concrete appear to be original or early modifications to the acequia. Concrete had been used in irrigation projects in the United States since 1825, when the Erie Canal was built (University of Rochester 2006). An unusual hay rake-wheel mechanism was added to most drains within the last 10 years. Many of the culverts underlie roads that appear to have been developed during the growth of Turley and are probably later additions to the system. Though the earliest map of the acequia appears to date from 1938, large cottonwoods along the course of the acequia indicate that the canal has not changed course during its lifetime. The diversion dam at the head of the canal has been continually rebuilt, owing to the variance of water levels in the river and the regularity with which it needed reconstruction. Two modern concrete highway barricades (Jersey barriers) have been placed at the leading edge of the dam.

SUMMARY

On July 6, 2005, WCRM personnel completed a survey and site recording for Blue Earth Ecological Consultants, Inc. for the Turley–Manzanares Acequia Rehabilitation Project in Turley, New Mexico. No sites were identified during the survey of Staging Areas 1 and 2, or of Access Roads 1 and 2. In addition to survey of other project components, features discovered along the length of the Turley–Manzanares Acequia were recorded. Three of the features (1-3) were in the COE project area, and 13 (4-16) were outside the COE project area.

The Turley–Manzanares Acequia is located along the San Juan River northwest of Manzanares Mesa. The acequia is situated in a portion of the valley that remains a rural landscape. Historic land use is evident in the modified landscape, spatial organization, buildings, structures, corrals, and water features.

The Turley–Manzanares Acequia was constructed in 1876 and is the oldest acequia along the San Juan River (Sizemore 2000). The acequia provided water to early Hispanic and Euroamerican homesteads and farmsteads, allowing for the production of agricultural crops and the raising of livestock. Modifications have been made to the acequia throughout its use; however, these changes have not significantly altered its character. The acequia is associated with settling of this segment of the San Juan River valley by Hispanic families from the Rio Grande area in New Mexico and the San Luis Valley in Colorado (Duke 1947:15).

This irrigation project represents early modifications to the landscape by Hispanic and Euroamerican settlers. The water enabled settlers to grow crops and raise livestock for their survival. Even so, some settlers nearly starved and many abandoned their efforts for land elsewhere (Duke 1947). Other families persevered, building up their landholdings and herds of livestock. Evidence of their survival is in extant homesteads, farmsteads, and acequias. Many of the present landowners are descendants of the original settlers. As such, the Turley–Manzanares Acequia is a living part of the history of present-day communities in the area.

The Turley–Manzanares Acequia still embodies the characteristics that make it distinctly representative of historic water delivery systems and has yielded information important to history. The acequia retains the integrity of location, design, setting, materials, workmanship, and feeling. Therefore, WCRM recommends the Turley–Manzanares Acequia eligible for nomination the NRHP as a site within a rural historic landscape under criteria (c) and (d) of 36 CFR 60.4. For this project, no further cultural resource investigation is recommended for the Turley–Manzanares Acequia.

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APPENDIX C

USFWS Coordination Act Report

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DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

September 21, 2006

Planning, Project and Program Management Division
Planning Branch

Mr. Wally Murphy
Acting Field Supervisor
New Mexico Ecological Field Office
U.S. Fish and Wildlife Service
2105 Osuna Road NE
Albuquerque, NM 87113-1001

Re: Draft FWCA Report for Turley-Manzanares Acequia Rehabilitation Project, San Juan Co., NM.

Dear Mr. Murphy,

We have reviewed the Draft Fish and Wildlife Coordination Act (FWCA) Report for the U.S. Army Corps of Engineers (Corps) proposed rehabilitation project for the Turley-Manzanares Acequia in San Juan County, New Mexico. The report is well written and assists the Corps in incorporating fish and wildlife conservation measures into the planning process. Enclosed are our responses to your recommended actions as part of this project.

Please contact Mr. Brett W. Thompson, Fishery Biologist, at 505-342-3378, if you have questions or require additional information. Your continued assistance and cooperation is appreciated.

Sincerely,

Julie Hall
Chief, Environmental Resources Section

Enclosures

Copy Furnished: Joel Lusk

**U.S. Army Corps of Engineers' Responses to Recommendations for the
Draft USFWS Fish and Wildlife Coordination Act Report.
TURLEY-MANZANARES ACEQUIA REHABILITATION PROJECT**

RECOMMENDATIONS

To prevent and reduce project impacts to fish and wildlife resources, the Service recommends the following measures:

1. *"Conduct a formal engineering feasibility study of possibly moving the heading structure downstream and diversion dam to reduce need for access to Acequia structures and maintenance impacts to San Juan River channel and riparian and wetland habitat."*

Response: In July of 2006, the USACE's general engineering branch conducted a feasibility analysis of moving the heading structure downstream as suggested. Following is a portion of their response: "The relocation of the point of diversion as suggested may provide a savings in either operation and maintenance or initial cost, but does not guarantee sufficient elevation to ensure continual irrigation water to the acequia. To ensure sufficient head for the project, flow may require raising the water level at that location which would induce flooding on the far bank. The existing point of diversion does not suffer from such a disadvantage." The New Mexico's Office of the State Engineer (OSE) came to same conclusion. Essentially, moving the diversion structure is not feasible from a hydraulic or financial standpoint. Therefore, the decision was made by the USACE and the OSE to not move the point of diversion location for the Turley-Manzanares Acequia.

2. *"If impacts are unavoidable, mitigate the loss of wetland, riparian and aquatic bottom habitats and monitor the project and mitigation area to evaluate growth and success of revegetated areas for a minimum of 3 years. Implement corrective actions, if necessary."*

Response: As stated in the project's draft Environmental Assessment, compensation for the loss of 1,290 ft² (0.03 acres) of wetlands and disturbance to riparian vegetation caused by the proposed action would consist of on-site restoration and enhancement of wetlands along the river side of the embankment downstream from the wire-wrapped rip-rap. Restoration and enhancement of approximately .47 acres would entail planting coyote willow whips and cottonwood tree poles along the bank at an appropriate elevation to ensure adequate moisture in the rooting zone. Planting specifications pertaining to the contract included planting coyote willow whips and cottonwood poles at a planting density of approximately 100 plants per acre, with a 20-foot on center (O.C.) spacing. Planting densities for coyote willow whips would be 3 foot O.C. spacing. Some irregular spacing and clustering would be incorporated into the planting design to emulate existing vegetation patterns, thereby avoiding the appearance of a tree plantation. The project complies with Executive Order 11990, Protection of Wetlands.

The planting mitigation would be monitored immediately following project completion and may be monitored one year following. Due to funding constraints, the Corps will not be able to monitor mitigation efforts for anytime beyond one year. Constraints beyond the control of the

Corps may affect project success. The acequia association would be well informed of these issues to help ensure a successful project.

The loss of aquatic bottom "ditch" habitat will not be mitigated or replaced in kind. The Corps feels as though this habitat is not of natural origin and provides limited, insignificant amounts of available habitat to aquatic dependent species. The loss of this habitat by piping the ditch may affect individual fish, macro-invertebrates, water-fowl, and aquatic dependent mammals, but would not affect local populations of any of these species.

3. *"Work with others in the San Juan River valley to maximize the value of the mitigation, and help restore local wetlands, riparian vegetation, terrestrial and aquatic habitat."*

Response: As part of this project the Corps has actively worked with the Turley-Manzanres Acequia Association, the Bureau of Reclamation, and the New Mexico Game Fish Department during the planning phases of this project. Their comments were utilized in the formulation of alternatives and planned mitigation. If large scale mitigation was required as part of this project, a larger effort would be expended to develop a more comprehensive, holistic mitigation plan. As part of this, other private land owners, and or agencies would be contacted to assist. However, the small scope of this project, and its' minimal impacts to aquatic and terrestrial habitat do not warrant such an effort.

4. *"Ensure that the best management practices identified in the Draft EA are implemented. Obtain water quality certification from the New Mexico Environment Department and implement all required activities. Additional monitoring of water quality impacts before, during, and after the project activities as well as best management practices may be necessary."*

Response: Best Management Practices identified in the EA would be implemented by the contractor and ensured by the presence of a Corps representative on site during project construction.

Acequia projects are exempt from sections 404 and 401 of the Clean Water Act. Since these permits are not necessary for acequia rehabilitation projects, water quality certification from New Mexico Environment Department was not applied for, nor received. Therefore, there are no required activities as part of this certification that need to be implemented.

5. *"Avoid impacting bald eagles during project activities. Conduct interagency consultation under the Endangered Species Act as necessary. Scarify compacted soils or replace topsoils and re-vegetate all disturbed sites with a suitable mixture of native plants."*

Response: The following measure would be implemented to minimize direct disturbance of Bald Eagles during project construction activities that take place from February through March. If a Bald Eagle is present within 0.25 miles of an active construction site in the morning before construction activity starts or is present following breaks in project activity, the project contractor would be required to suspend all activity until the bird leaves of its own volition or until a USACE biologist, in consultation with the U.S. Fish and Wildlife Service, determines that the potential for harassment is minimal. However, if a Bald Eagle arrives during construction activities or if an eagle is greater than 0.25 miles away, construction need not be interrupted. If

Bald Eagles are consistently found in the immediate project area during the construction period, the U.S. Fish and Wildlife Service would be contacted to determine whether formal consultation under the Endangered Species Act is necessary. An effect determination concurrence letter as part of section 7 consultation was sent to the Service on August 9, 2006, and subsequent concurrence was received.

Re-seeding of disturbed soils surrounding the project area would be done in conjunction with this project. The construction contractor will use a mix of viable native grass seed to re-vegetate disturbed areas. These areas include those disturbed by construction machinery in upland terrestrial areas, as well as those areas used for staging equipment, construction materials, and personnel vehicles.

Final Fish and Wildlife Coordination Act Report
for the
***Turley-Manzanares Acequia Rehabilitation Project, San
Juan County, New Mexico***



Photo by Joel D. Lusk, USFWS



**U.S. DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service**

**Prepared for the U.S. Army Corps of Engineers
By the U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque, New Mexico 87113**

September 2006

Final Fish and Wildlife Coordination Act Report

for the

**Turley-Manzanares Acequia Rehabilitation Project,
San Juan County, New Mexico**

Submitted to:

U.S. Army Corps of Engineers
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109-3435

Prepared by:

Joel D. Lusk
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September 20, 2006

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INTRODUCTION

The Water Resources Development Act of 1986 (Public Law 99-662) authorizes restoration and rehabilitation of irrigation ditch systems (acequias) in the Southwest. In New Mexico, the acequia rehabilitation program is managed by the U.S. Army Corps of Engineers, Albuquerque District (USACE) and the New Mexico Interstate Stream Commission (ISC). In March 2006, the USACE requested the United States Fish and Wildlife Service (Service) prepare a Fish and Wildlife Coordination Act Report (CAR) for the proposed rehabilitation of the Turley-Manzanares Acequia in San Juan County, New Mexico (Proposed Project). This CAR has been prepared under the authority of and in accordance with the requirements of Section 2(b) of the Fish and Wildlife Coordination Act (FWCA; 48 Stat. 401, as amended; 16 USC 661-667e). The FWCA provides for the consideration of fish and wildlife conservation measures identified in a CAR that can be incorporated into water resource development projects such as the Proposed Project. This report describes the fish and wildlife resources existing without the project, potential impacts to fish and wildlife resources with the project, and recommendations (mitigation) to decrease adverse effects and maximize benefits to fish and wildlife resources.

DESCRIPTION OF THE STUDY AREA

The Turley-Manzanares Acequia (Acequia) is located on the San Juan River in San Juan County, New Mexico (SE 1/4 Section 35, Township 30 North, Range 9 West, New Mexico Principal Meridian), approximately 16 miles [mi] (25.7 kilometers [km]) east of Bloomfield, New Mexico and about 14.3 mi (23.0 km) downstream from the Navajo Reservoir Dam (Figure 1). The Acequia parallels the San Juan River along the left (south) bank and is oriented in a southwestern direction (Figure 2). For the purposes of this CAR, the river near the proposed project will be referred to as east-west in orientation with banks being on the north and south (Figure 3). The Study Area includes the Acequia and the San Juan River, including the riparian vegetation and local fish and wildlife, wherever the Proposed Project may affect these resources.

Hydrologic Setting

The San Juan River arises on the western slope of the San Juan Mountains and enters the northwestern portion of New Mexico at the Navajo Reservoir. The dam is located on the San Juan River approximately 44 miles upstream from Farmington, New Mexico. After construction of the Navajo Reservoir between 1958 and 1963, water releases from the dam focused on meeting irrigation needs, providing flood control, maintaining stable flows, and providing a pool for recreation in the reservoir. However, over the last decade, the focus and associated pattern for releasing water from Navajo Reservoir has changed to mimic a natural hydrograph identified as that previous to the construction of the Navajo Reservoir (Holden 1999), in part to incorporate the biological needs of native endangered fish and allow for water development to proceed. The Navajo Reservoir is now operated to release from 250 cfs to 5,000 cfs (7 to 142 cms) below Navajo Dam (BOR 2006).

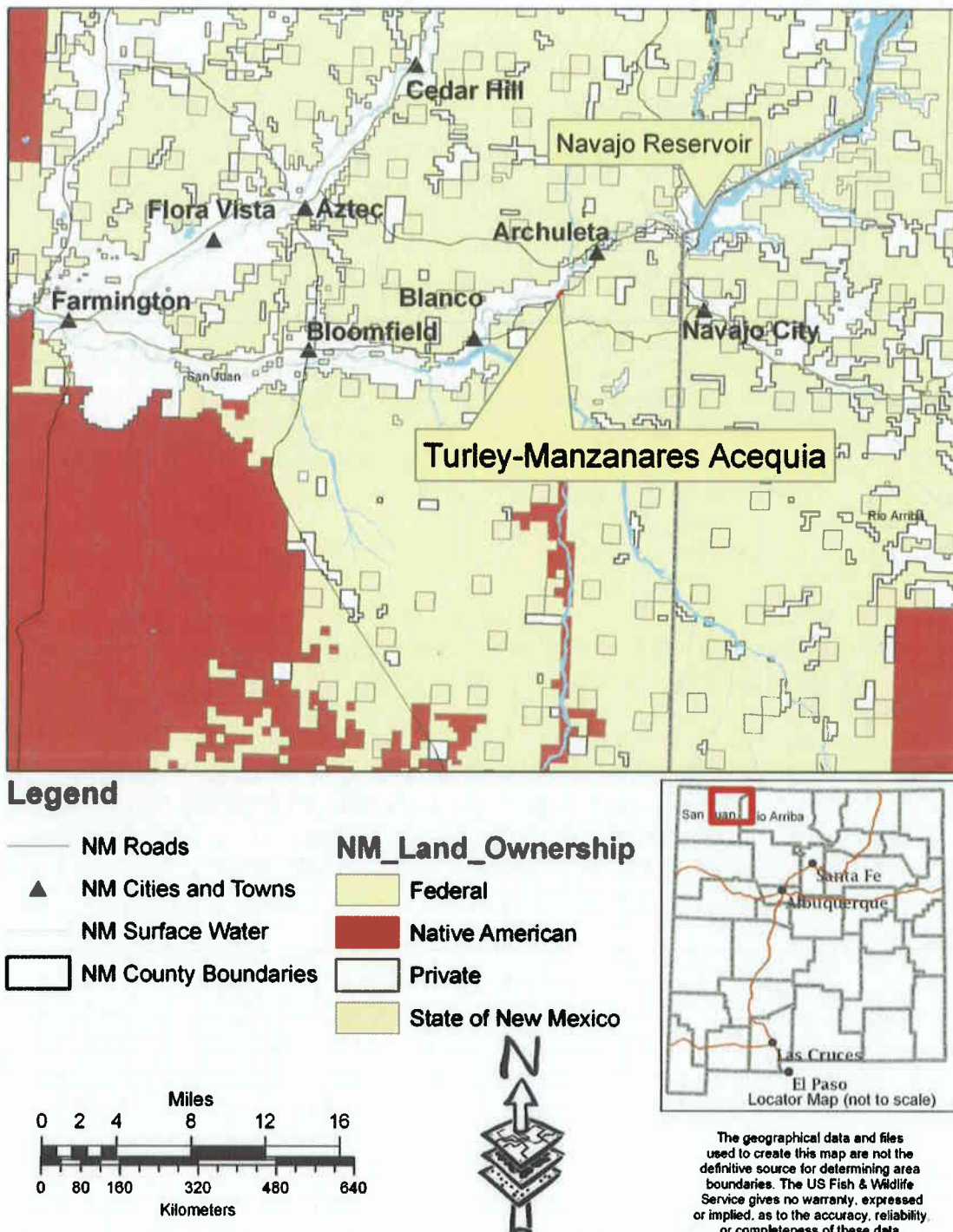
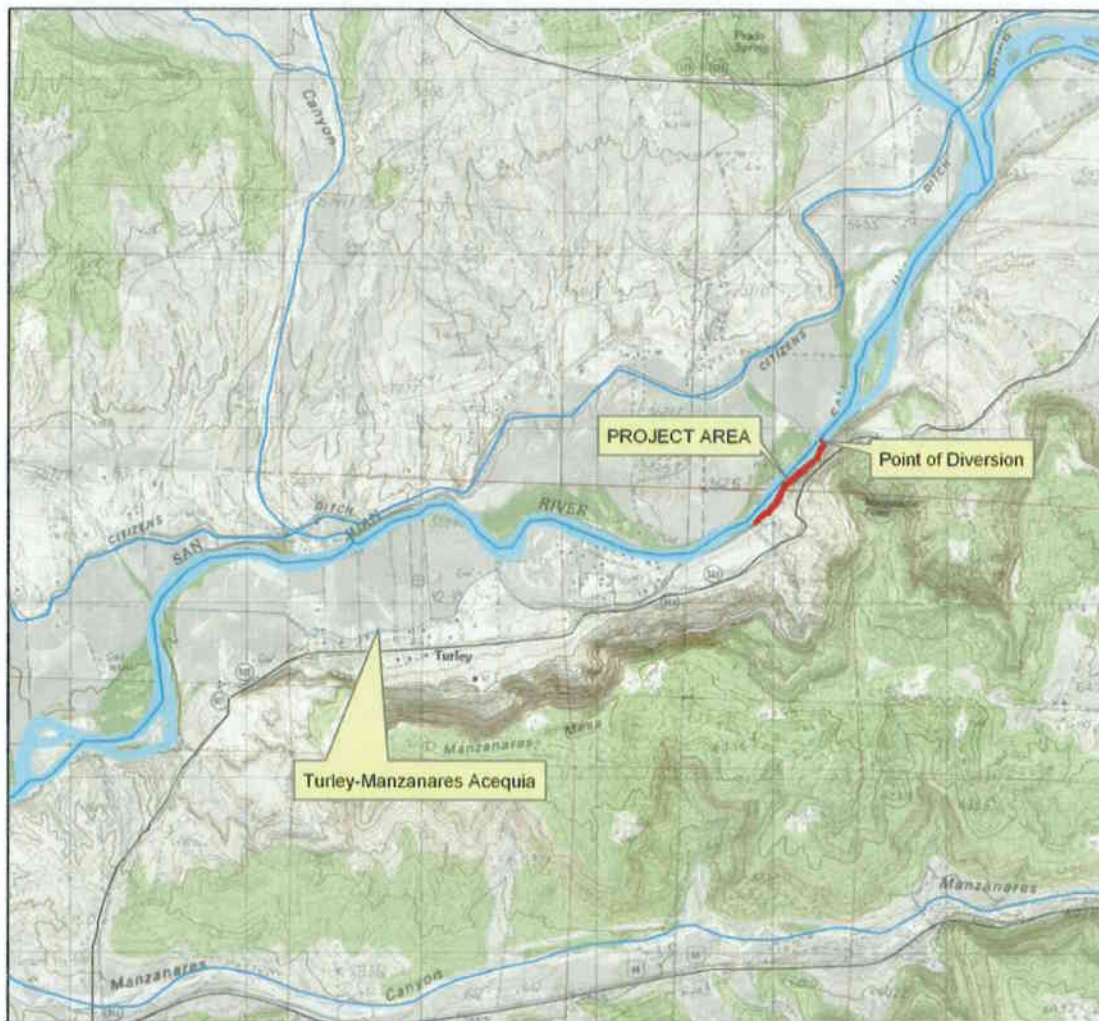
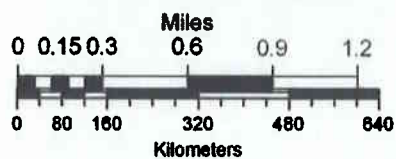


Figure 1. Location of the Turley-Manzanares Acequia Project in New Mexico.



Legend

- NM Cities & Towns
- NM Roads
- NM Surface Waters

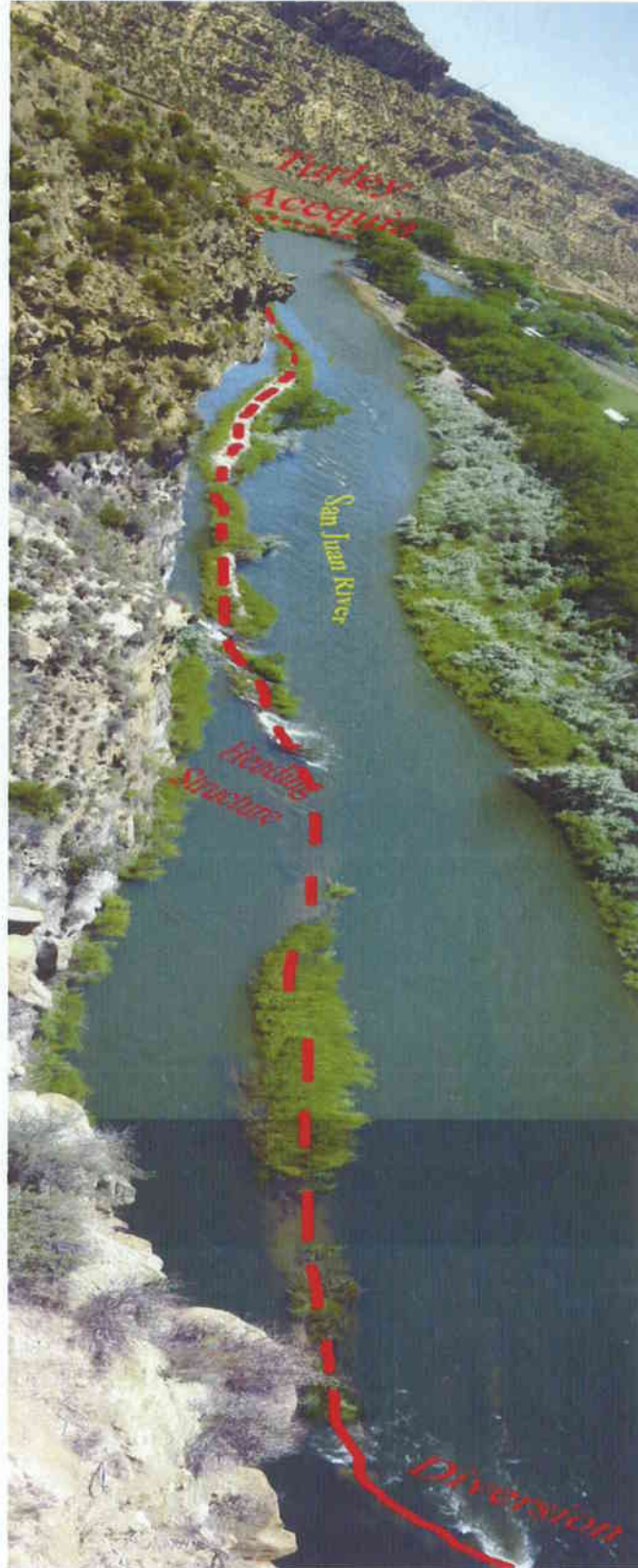


The geographical data and files used to create this map are not the definitive source for determining area boundaries. The US Fish & Wildlife Service gives no warranty, expressed or implied, as to the accuracy, reliability, or completeness of these data.



Figure 2. Location of the Turley-Manzanares Acequia Project Area.

Figure 3. Diagram of the Turley-Manzanares Acequia along the San Juan River, New Mexico.



Water Quality

The primary source of water in the San Juan Hydrologic Unit is surface water (ISC 2003). Historically water in the San Juan Basin has been used primarily for agricultural irrigation (ISC 2003). The U.S. Geological Survey publishes annual reports containing a wide variety of water quality and other hydrologic data (e.g., Blanchard and others 1993; Thomas and others 1996, 1998; Ortiz and others 2001; Byrd and others 2003). These data include many chemical constituents (metals, nutrients, ions, organic compounds, etc.), biological measurements (including bacteria numbers and measurements related to nutrient enrichment), and physical attributes (e.g., suspended sediment). The participants of the San Juan River Basin Recovery Implementation Program have also published a variety of water quality and fish habitat data (Abell 1994; Holden 1999; Simpson and Lusk 1999; Bliesner and Lamarra 2000; Anonymous 2002; Wirth 2002). Collectively, these data and reports constitute the major resources for understanding water quality trends and conditions in the San Juan River.

The San Juan River is characterized by good water quality when flows are released from Navajo Dam, but water quality progressively degrades downstream due to natural and anthropogenic activities including bank erosion, diversions, agricultural and municipal return flows, and tributary contributions (BOR 2003). Generally, surface water quality throughout the San Juan River in the region supports aquatic and aquatic-dependant life (NMWQCC 2006). However, mercury consumption advisories have been issued based on the quality of fish tissues found in the San Juan River upstream of Blanco, New Mexico (NMDOH et al. 2001). Additionally, portions of the San Juan River were determined to contain excess fecal coliform and stream bottom deposits (NMWQCC 2006). Subsequently, Total Maximum Daily Load management plans were developed to improve these water quality conditions (NMED 2005). Additionally, numerous agencies and individuals have worked with the NMED to develop a comprehensive San Juan River Basin Plan to address water quality concerns in the watershed (San Juan Watershed Group 2005).

Water quality conditions in the San Juan River near the project area were measured by the U.S. Bureau of Reclamation (BOR; 1998, 2002, 2006) during low flow conditions. Water temperatures near the Blanco Bridge ranged from 0.5 C (32.9°F) to 6.5 (43.7°F) and averaged 4.2 C (39.6°F) (BOR 1998). Average DO ranged from 7.80 mg/L to 7.61 mg/L. No evidence of oxygen sag was observed indicating that oxygen levels did not differ dramatically with time of day (BOR 2006). Average conductivity changed from 257 microSiemens per square centimeter (uS/cm) to 366 uS/cm (BOR 1998).

PROJECT DESCRIPTION

The USACE (2006) proposes to: 1) replace the existing heading structure with a gated heading; 2) install 1,200 linear feet [ft] (0.4 km) of 36-inch [in] (0.9 m) reinforced concrete pipe; and 3) place wire-wrapped rip-rap along 103 feet of the embankment. The main objective of the Acequia rehabilitation project is to improve the efficiency of water delivery to the Acequia members. The Acequia is in need of rehabilitation because the

existing system for delivering water is difficult and costly to operate and maintain. According to the USACE (2006), high flows have eroded the berm that separates the Acequia inlet channel from the San Juan River. The berm has been overtopped by high flows and some of its rock armoring has been washed away. The existing Acequia facilities consists of a diversion groin that extends approximately one-third of the way across the river channel. It is composed of boulders and concrete rubble. The diversion groin directs flow into the inlet channel to the ditch heading structure and sluice. An open ditch conveys water from the heading structure to downstream agricultural fields. The ditch is about eight feet wide and is separated from the river channel by a narrow berm. Because the heading structure does not adequately control flow into the ditch, water overtops the ditch during high flows and washes out the berm. Large amount of debris are diverted into the inlet channel along with water and the debris builds up against the heading structure and sluice. In addition, erosion on the adjacent hill slope to the south results in substantial amounts of sediment deposition in the ditch. This results in changes in the slope of the ditch channel and reduces the capacity of the ditch to convey water to downstream agricultural fields (USACE 2006).

These problems have resulted in Acequia maintenance in the project area to require replacement of rock at the diversion groin and on the embankment at breach points, dredging of the ditch, and removal of trash at the heading structure and sluice. These maintenance activities are typically conducted on an annual basis and involve operation of construction equipment along the approximately 1,200-ft (0.4 km) length of the embankment from the diversion groin downstream. The primary objective of the Acequia rehabilitation project is to improve the efficiency of water delivery to the Acequia members by correcting the current problems. A secondary benefit of the proposed project would be to reduce maintenance costs for the Ditch Association (USACE 2006).

The Proposed Action and Alternatives

The USACE (2006) has proposed one action alternative and a no action alternative. The no action alternative would consist of no improvements to the existing diversion facilities. The existing diversion groin, inlet channel, heading structure and sluice, ditch, and berm would continue to function and be maintained as they have in the recent past. Typical maintenance in the project area includes: placement of rock and fill materials at breach points, dredging of the ditch, and removal of debris.

The proposed action would involve construction of a gated heading structure and installation of 1,200 ft (0.4 km) of 36-in (0.9 m) elliptical reinforced concrete pipe. Approximately 80 ft (24.4 m) of dumped riprap would be placed at the existing diversion groin location to create a guide weir that would direct stream flow to the inlet channel. Construction of the guide weir would involve placing riprap material (i.e. angular rock) at the existing diversion groin location. The existing material would be left in place. The new guide weir would have a top elevation two feet below the bank elevation, which would allow for overtopping at high flows, similar to the existing diversion groin. The new guide weir would also be permeable to base flows, as there would be voids in the rock fill that would

allow some water to flow through. The inlet channel area would be protected by a trash rack installed parallel to stream flow, which would serve to catch debris and keep it from collecting at the heading structure. A new heading structure would be constructed from concrete capped gabions. The top elevation of the gabions would match the top height of the bank. The heading structure would be fitted with a slide gate at the ditch inlet and a sluice gate to allow for regulation of the amount of water diverted into the concrete pipe. The reinforced concrete pipe would be placed along the existing ditch alignment from the heading structure downstream for a distance of 1,200 ft (0.4 km). The pipe would be covered with soil. Approximately 103 linear ft (31.4m) of wire-wrapped riprap would armor the embankment on the downstream side of the guide weir. The proposed action would involve use of construction equipment and staging areas only on the south side of the river.

Another alternative was considered but eliminated from detailed study (USACE 2006). An alternative involving construction of an inflatable spillway system was initially considered in the USACE reconnaissance report. The USACE (2006) determined that the split weir of the inflatable spillway system would create a barrier to upstream fish movement in the San Juan River and it would also negatively affect boating in the river by creating an obstacle that would require portaging around. The USACE identified impacts associated with in-channel construction that would negatively affect water quality and the fish community in the project area. Due to the identified environmental effects and cost, this alternative was eliminated from further analysis by the USACE (2006).

EVALUATION METHODOLOGY

Project planning began in May 2005 when Blue Earth Ecological Consultants, Inc., contacted the U.S. Fish and Wildlife Service (Service) on behalf of the USACE and the ISC regarding the rehabilitation of the Acequia and seeking input for project planning. The Service responded in June 2005 with a general list of concerns and a list of endangered and threatened species that might be found in the project area. The USACE and the Service further discussed the scope of work for the CAR as well as the project features, design, construction methods and potential mitigation measures in March 2006. The USACE provided a preliminary draft Environmental Assessment for the Acequia (draft EA) on June 2, 2006. The Service met with representatives of the Acequia on June 6, 2006, as well as representatives from the New Mexico Department of Game and Fish (NMDGF) and toured the facility, took photographs and discussed options for conservation of fish and wildlife resources as well as the design of the Proposed Project. One of the recommendations of the NMDGF in both their response to the May 2005 scoping letter (USACE 2006) and during the site visit was the feasibility of moving the heading structure for the Acequia south. On June 7, 2006, the Service requested the USACE determine if the design change is feasible. On June 8, 2006, the USACE began a review of the recommended design change in terms of its engineering feasibility. The draft EA (USACE 2006) was reviewed and selected text was used extensively throughout this CAR. Additional biological and water quality data and background information were derived through a review of the Navajo Reservoir Operations Final Environmental Impact Statement including its preliminary and component reports

(BOR 1998, 2002, 2006). Conversations with representatives from the NMDGF, the USACE and other area scientists were conducted in June 2006 to discuss this report and potential options for wildlife and wetland conservation and habitat mitigation.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Aquatic, Riparian and Wetland Resources

The first 7 mi [11.3 km] of the river downstream from Navajo Dam supports a significant wetland and riparian area that receives water primarily from the river and tributary groundwater. On the 40-mile reach of river between Archuleta and Farmington, agriculture, grazing, natural gas development and commercial developments have impacted riparian areas (BOR 2003). Most of this section of river is in private ownership, and significant areas have been cleared of wetland/riparian vegetation, thereby reducing wildlife habitat, to allow for the expansion of agriculture, ranching and commercial development (BOR 2003).

Riparian ecosystems include the ribbon-like mesic vegetative communities occurring between aquatic and more xeric upland sites (Knopf et al. 1988). Willson and Carruthers (1972) referred to riparian vegetation as the “aorta of an ecosystem” because of its significance to the perpetuation of water, fish, wildlife, and rangeland and forest resources. Johnson et al. (1977) reported that over 50 percent of all breeding bird species are completely dependent upon riparian vegetation in the Southwest. In New Mexico, 46 percent of the breeding bird species depend on riparian habitat in the San Juan Valley (Schmitt 1976).

There is about 0.47 acres of riparian habitat in the project area (USACE 2006). This habitat is located on both sides of the Acequia alongside the San Juan River (Figure 3). Riparian and wetland habitat in the project area was characterized by the USACE (2006) as containing dense stands of young coyote willow, narrowleaf cattail, sedge, cocklebur, chairmaker's bulrush, marshy spike-rush, field horsetail, Russian olive and cottonwood. (See Appendix A for a list of the common and scientific names of local plant species).

The riparian and wetland habitat along both sides of the Acequia were impacted periodically by maintenance activities performed on the existing facility (USACE 2006). Annual cleaning of the Acequia disturbs the riparian and wetland habitat along its banks and maintains them in an early successional state with many of the woody plants having small-diameter. Riparian vegetation on the top of the embankment between the Acequia and the San Juan River has been cut every year or two with a brush-hog and coyote willow patches have been sprayed periodically with the herbicide 2,4-D (USACE 2006). Similarly, portions of the wetlands along the riverside of the embankment are periodically disturbed by repair of breaches in the embankment and maintenance of the diversion guide weir (USACE 2006). The existing diversion groin extends about one-third the river channel width (USACE 2006).

The USACE (2006) reported that there was 3.33 acres (1.35 hectares [ha]) of aquatic habitat in the San Juan River in the project area from the diversion guide weir downstream to

the western limit of the work area during a base flows of about 500 cubic feet per second (ft^3/s) (14.16 cubic meters per second [m^3/s]). Using fish habitat characterization techniques (Arend 1999), the USACE (2006) determined that 62 percent aquatic habitat (~0.2 acres [0.8 ha]) was relatively uniform run habitat, 28 percent (0.9 acres [0.4 ha]) was riffle habitat and glide habitat constituted the remaining 10 percent (0.3 acres [0.1 ha]) of aquatic habitat in the project area. The channel of the San Juan River in the project area was characterized by a cobble-dominated substrate with less than 10 percent fines (New Mexico Environment Department 2005). The Acequia contained 0.41 acres (0.2 ha) of low velocity aquatic habitat. Acequia substrate was not characterized and we assumed it was cobble and bedrock.

Fish species collected in the San Juan River in the vicinity of the project area include rainbow trout, brown trout, red shiner, common carp, fathead minnow, speckled dace, white sucker, flannelmouth sucker, bluehead sucker, plains killifish, western mosquitofish, and mottled sculpin (USACE 2006; BOR 2003; Sublette et al., 1990). (See Appendix B for a list of the common and scientific names of fish species). Of these 12 species, only speckled dace, flannelmouth sucker, bluehead sucker, and mottled sculpin are native to the San Juan River drainage. The remaining eight species are introduced.

Navajo Reservoir acts as a sediment trap and releases of water from the bottom are cold and relatively constant. This cold, clear water below the Navajo Dam is sometimes termed a "tailwater fishery" in that it supports trout and aquatic life adapted to the coldwater conditions that are unlike those found in remainder of the San Juan River downstream of Blanco, New Mexico. The New Mexico Department of Game and Fish began managing a portion of the tailwater as a special regulation trout fishery in the 1960s, and since then, the area has developed into a year-round sport fishing business and premier fishing destination.

In the reach nearest the Acequia, Wethington (1996) collected 1,100 trout using raft-mounted electrofishing techniques. Wethington (1996) reported 32 percent were rainbow trout and 68 percent were brown trout. Brown trout reproduce naturally in the San Juan River below Navajo Dam. The New Mexico Department of Game and Fish regularly stocks rainbow trout in the tailwater section of the San Juan River (USACE 2006).

Most juvenile fish prefer shallow, low velocity habitats. This habitat includes backwaters, shoals, eddies, pools, and slackwaters. In the San Juan River, these habitats comprise less than 15 percent of the total habitat (Bliesner and Lamarra 1996). For larger fish species, habitat preferences are more diverse but tend toward deeper, moderate velocity water compared to juveniles. In the San Juan River, runs typically comprise at least 70 percent of the total habitat at any discharge (Bliesner and Lamarra 1996). Thus, there appears to be adequate adult fish habitat available for both native (Miller and Ptacek 2000) and non-native species (Holden 1999, Propst and Hobbes 1999).

DuBey and Jacobi (1996) reported on the benthic macroinvertebrate community found in the Acequia Project Area. Significant populations of mayfly (*Ephemerella inermis*) and dipterans (*Simulium* and Chironomidae) were found. DuBey and Jacobi (1996) reported

an standing crop that ranged from 25,919 to 98,306 organisms per square meter (m^2) and an average of 53,765 organisms/ m^2 at their Site 3 reach that included the river near the Acequia.

Terrestrial and Wildlife Resources

The upland region near the Acequia project area receives less than 8 inches of precipitation annually and is characterized by desert physiography with broad dry washes carry significant sediment loads during periodic thunder-storm events. The project area is situated in semiarid tablelands of the Great Basin Desert Scrub vegetation community (Dick-Peddie 1993). Plants commonly occurring in the project area include: piñon pine, Utah juniper, Gambel's oak, bluestem, switch grass, sideoats, big sagebrush, soapweed yucca, mesquite, fourwing saltbush, rabbit brush, indian ricegrass, western wheatgrass, mallow, galetta and snakeweed. Cacti include several hedgehogs, prickly pears, and chollas.

The USACE (2006) contracted a biological field survey of the project area that was conducted in May and July 2005. Upland terrestrial habitat in the project area was limited to access roads and staging areas and was characterized by relatively low plant species diversity and relatively high levels of human disturbance. Upland terrestrial habitat in the project area was characterized by a dominance of shrubs including big sagebrush, rubber rabbitbrush, three-leaf sumac, fourwing saltbush, and soapweed yucca.

The BOR has identified 84 mammals, 11 amphibians, 34 reptiles, and 150 bird species in the general San Juan River Valley (BOR 2006). Representative bird species found in riparian and wetland habitats of the San Juan River include: Cooper's hawk, peregrine falcon, Gambel's quail, western sandpiper, mountain plover, yellow-bellied sapsucker, yellowlegs, lark sparrow, dipper, belted kingfisher, great-horned owls, red-winged blackbird, tree swallow, mountain chickadee, nuthatch, boat-tailed grackle, sparrows, Western meadowlark, pied-billed grebe, northern shoveler, double-crested cormorant, warblers, teal, and other migratory waterfowl. The BOR (2002) contracted aerial and point count surveys of migratory waterfowl in the tailwaters reach of the San Juan River and reported as many as 63 to 103 waterfowl per river mile. Representative bird species found in arid upland habitats include: various hawks, peregrine falcon, scaled quail, pheasant, willet, ring-billed gulls, mourning dove, short-eared owl, burrowing owl, cliff swallow, black phoebe, and various passerine birds. A list of common and scientific names of avian species discussed in this report is provided in Appendix C.

Representative mammal species found in the San Juan River Valley include: pallid and big brown bats, little brown and small-footed myotis, silver-haired bat, Townsend's big-eared and Mexican free-tailed bat, cottontail, jackrabbit, beaver, Gunnison's prairie dog, kangaroo rats, shrews, rodents, squirrel, coyote, river otter, long-tailed weasel, mink, raccoon, skunk, foxe, pronghorn, elk and mule deer. A list of common and scientific names of mammals discussed in this report is provided in Appendix D.

Representative amphibians found in the San Juan River Valley include: tiger salamanders, toads, and frogs. Representative reptiles include: whiptail, rattlesnake, corn snake, many-lined skink, common kingsnake, desert spiny lizard and garter snake. Representative amphibians found include: tiger salamander and various toad and frog species. A list of common and scientific names of amphibians and reptiles found in the San Juan River valley is provided in Appendix E.

Threatened and Endangered Species

As the quality and quantity of the fish and wildlife habitat within the San Juan River valley has decreased over time from habitat alteration and large-scale water development, so has its ability to sustain native flora and fauna. Several species native to the project area have been listed as federally endangered or threatened under the Endangered Species Act. These listed species include: Colorado pikeminnow, razorback sucker, southwestern willow flycatcher, bald eagle, and Knowlton cactus.

Colorado Pikeminnow

The project area is within the known and historic range of the Colorado pikeminnow. The Service listed the pikeminnow as endangered March 11, 1967 (32 FR 4001). However, the current distribution of the pikeminnow does not include the San Juan River near the Acequia due to the water quality conditions created by the Navajo Dam (BOR 2003).

Razorback Sucker

The project is also within the known and historic range of the razorback sucker. The Service listed the razorback sucker as endangered on October 23, 1991 (56 FR 54947). However, the current distribution of the razorback sucker does not include the San Juan River near the Acequia due to the water quality conditions created by the Navajo Dam (BOR 2003).

Southwestern Willow Flycatcher

The Service listed the southwestern willow flycatcher (flycatcher) as endangered on February 27, 1995 (60 FR: 10694-10715). The flycatcher is a riparian obligate bird and it nests in riparian thickets associated with streams and other wetlands where dense growths of willow, cottonwood, buttonbush, boxelder, Russian olive, salt cedar and other plants. The current range of the flycatcher includes San Juan River valley (Unitt 1987; Browning 1993). Available habitat and overall numbers have declined statewide in conjunction with modification of wetlands and riparian habitat (62 FR: 39129-39147). Flycatchers begin arriving in New Mexico in late April and May to nest, and the young fledge in early summer. Flycatchers nest in thickets of trees and shrubs approximately 6.5 - 23 ft in height or taller, with a densely vegetated understory from ground or water surface level to 13 ft or more in height. Surface water or saturated soil is usually present beneath or next to occupied thickets (Phillips et al. 1964, Muiznieks et al. 1994). The USACE (2006) determined that there was no suitable habitat for the flycatcher in the project action area.

Bald Eagle

The project area is also within the known and historic range of the bald eagle. The Service reclassified the bald eagle from endangered to threatened on July 12, 1995 (60 FR: 36000-36010). Adults of this species are easily recognized by their white heads and dark bodies. Wintering bald eagles frequent all major river systems in New Mexico from November through March, including the San Juan River. Bald eagles prefer to roost and perch in large trees near water. Bald eagle prey includes fish, waterfowl, and small mammals. The BOR (2002) reported a pair of wintering bald eagles upstream from the Acequia during their waterfowl surveys.

Knowlton cactus (*Pediocactus knowltonii*)

Currently, the only known viable population of Knowlton cactus is on about five hectares of land in New Mexico's San Juan County (Knight 1981; Heil 1985). Knowlton cactus was listed as endangered under on October 29, 1979 (44 FR 62244). Knowlton cactus occurs in the rolling topography with gravelly soils in openings of piñon-juniper woodlands at 5,900 to 6,400 ft (1.8 to 2.0 km) in elevation (Knight 1981). Knowlton cacti are known to occur in the region (Heil 1985). However, the proposed activities at the Acequia would not affect habitat at the elevation or in the locations where the Knowlton cactus are known.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

Impacts to Water Quality

Rehabilitation of the guide weir and construction of a new ditch heading would cause short-term increases in turbidity and suspended sediments from placement of rock fill, operation of construction equipment to place the rock, and construction of the concrete-capped gabion heading structure (USACE 2006). These activities would disturb about 5,487 ft of stream bottom, with 97 percent of the disturbance occurring at the diversion groin. A total volume of about 24 yd of fine sediment could potentially be suspended in surface water of the San Juan River (USACE 2006). According to the USACE (2006), these impacts would likely occur in the San Juan River from the diversion downstream for a distance of about 0.5 miles. To minimize these impacts, the USACE (2006) proposes to use fill material that would be free of fines to minimize turbidity excursions and downstream sedimentation.

Impacts to Wetland Habitat

The proposed action would fill the 0.03ac wetlands in the project area, effectively converting the ditch into floodplain land surface. Conversion of the open ditch to a buried pipeline would result in filling of about 975 ft of wetland on the ditch side of the embankment. Installation of wire-wrapped riprap on the riverside of the embankment below the diversion weir would result in fill of another 315 ft of wetland. Therefore, a total of about 1,290 ft (393 m) of wetlands would be filled by the proposed action.

The USACE (2006) proposes to mitigate for the loss of these wetlands. The mitigation would consist of on-site restoration and enhancement of wetlands along the riverside of the embankment downstream from the riprap. Restoration and enhancement would consist of planting coyote willow cuttings along the bank.

Impacts to Riparian Habitat

Riparian areas are among the most threatened environments in New Mexico (U.S. Environmental Protection Agency 1991) and the piecemeal losses of riparian habitats have an adverse cumulative impact on wildlife utilizing these areas. The proposed action would remove the 0.42 acres of riparian vegetation on the embankment between the ditch and the river. This would include two large cottonwood trees and all of the New Mexico olive and cottonwood saplings in the area. Over 18,000 coyote willow stems would also be removed by the proposed action. The four large cottonwood trees at the picnic area may be adversely affected by soil compaction from equipment operation.

The USACE (2006) has indicated that implementing protective measures reduces the impacts to portions of riparian habitat. Construction fencing would be placed around the large cottonwood trees at the picnic site to prevent soil compaction in their effective root zones. Fencing would be placed at or beyond the canopy drip lines of the individual trees. Coyote willow cuttings and cottonwood poles would also be planted on the riverbank along the length of the embankment in the project area. This vegetation planning would be conducted in conjunction with mitigation for wetland impacts.

Impacts to Aquatic Habitat

The proposed action would include placement of soil to fill the existing ditch, bed the pipe, and level the ground surface of the filled area at a local elevation of 101 ft. The resulting fill would cover about 1.62 acres and would be similar in composition to existing soils (i.e. gravels and coarse sand). Placing a buried pipe in the ditch would eliminate about 0.41 acres of low-velocity aquatic habitat found in the open ditch. About 0.13 acres (5,487 ft) of stream substrate in riffle habitat would be disturbed by construction of the new ditch heading and guide weir.

Aquatic habitat along the embankment would be adversely affected by removal of overhanging vegetation cover, composed mainly of coyote willow. This overhanging vegetation provides shade, terrestrial invertebrate prey items, and leaf litter that contributes to the aquatic food web. Approximately 1,070 ft of near-bank aquatic habitat would be affected by removal of overhanging vegetation.

Impacts to Aquatic Fish and Wildlife Resources

According to the USACE (2006), increased turbidity by the proposed action could reduce the reactive distance of trout to prey items, thereby reducing their encounter rate with prey, which results in increased energy expenditure by individual foraging trout. Construction would occur during the winter months, coincident with the period of brown trout spawning and egg incubation. Suspension of fine sediments and subsequent deposition of those sediments downstream could potentially blanket and smother eggs of spawning brown trout that are located downstream from the project area.

Fish passage conditions and entrainment into the Acequia are not expected to change under the proposed action. The movement of fish up- and downstream should continue at the diversion site as it has in the past. The new guide weir would extend across one-third of the channel width, as does the existing diversion groin. The new guide weir would have a top elevation equivalent to the existing diversion groin and would be porous to stream flow. Patterns of current velocity and water depth at and around the new guide weir are expected to be equivalent to existing conditions. Consequently, fish passage conditions at the diversion would not change with the proposed action.

The potential for entrainment of fish into the Acequia by the diversion structure would be similar to existing conditions. However, the extent of fish entrainment by the existing structure is not known. In summary, the proposed alternative would result in a direct loss of aquatic habitat (0.47 ac [0.19 ha]), wetlands (0.03 ac [0.01]) and riparian vegetation (0.42 ac [0.17 ha]) that provides life stage support for aquatic plants, aquatic invertebrates, amphibians, reptiles and water dwelling mammals and migratory birds (Table 1). The Acequia's aquatic habitat (1,659 m²) provides for habitat and food for over 11 million macroinvertebrates, some of which are likely prey for fish and wildlife (Gray 1993). Similarly, this aquatic habitat provides resting and feeding habitat for 15 to 24 waterfowl in the winter.

Impacts to Terrestrial Habitat and Wildlife

Construction of diversion and ditch features for the proposed action would result in minor impacts to terrestrial vegetation at the proposed staging site on the south side of the river. Staging of equipment and materials would result in temporary impacts to about 0.3 acres of terrestrial habitat. According to the USACE (2006) the impacts to 0.3 acres of this terrestrial habitat would be temporary and vegetation of similar species composition and density would probably recover within a period of up to five years.

Short-term impacts to wildlife may occur from noise, dust, and the presence of workers and machinery during project construction. Long-term adverse impacts may occur from the loss of terrestrial vegetation from construction of permanent structures, soil erosion, new access roads, staging areas, and compaction of soils.

Table 1. Area of Habitat Types Existing and Affected by the Alternatives for the Turley-Manzanares Acequia Project (based on USACE 2006).

Habitat Type in Project Area	Existing Condition	Disturbance under the No Action Alternative	Disturbance under the Proposed Alternative
Riparian Habitat in Project Area	0.47 ac	0.22 ac with annual temporary impacts	0.42 ac removed
Wetlands in Acequia	0.02 ac	0.02 ac with annual temporary impacts	0.02 ac permanent fill
Wetlands in River	0.08 ac	0.02 ac with annual temporary impacts	0.01 ac permanent fill
Aquatic Habitat in Acequia	0.41 ac	0.41 ac with annual temporary impacts	0.41 ac permanent fill
Aquatic Habitat in River	3.33 ac	- 0.05 ac with annual temporary impacts (diversion repairs)	0.13 ac riffle habitat with temporary impacts
Terrestrial Habitat	11.4 ac	0 ac	0.3 ac temporary impacts

Impacts to Threatened and Endangered Species

With the exception of the bald eagle, the USACE determined that the proposed project will have no effect on federally listed as endangered or threatened species. The proposed construction period may overlap with the bald eagle winter use of habitat in New Mexico. Bald eagles are sensitive to human perturbations. The proximity of the project area to bald eagle habitat may cause them to move and concentrate at other sites or use less than optimal habitat. The USACE (2006) has proposed the following measure to minimize direct disturbance of bald eagle during project construction activities that will take place from February through March 2007.

If a bald eagle is present within 0.25mi (0.4 km) of an active construction site in the morning before construction activity starts or is present following breaks in project activity, the project contractor would be required to suspend all activity until the bird leaves of its own volition or until a USACE biologist, in consultation with the Service, determines that the potential for harassment is insignificant or discountable. However, if a bald eagle arrives during construction activities or if a bald eagle is greater than 0.25 mi (0.4 km) away, construction need not be interrupted. If bald eagles are consistently found in the immediate project area during the construction period, the Service would be contacted to determine the appropriate actions to take through consultation under the Endangered Species Act and the Eagle Protection Act.

Implementation of measures to minimize disturbance impacts to bald eagle may provide adequate protection to the bald eagle. Upon a selection of the final agency action, the USACE must conduct section 7 consultation of the Endangered Species Act with the Service on those activities that they determine may affect listed species or critical habitat.

DISCUSSION

Construction projects that result in adverse impacts to fish and wildlife resources require the development of mitigation plans. These plans should consider the value of fish and wildlife habitat affected. The Service has an established mitigation policy used as guidance in recommending mitigation (Service 1981). This policy states that the degree of mitigation should correspond to the value and scarcity of the fish and wildlife habitat at risk. Four resource categories in decreasing order of importance are identified.

Resource Category No. 1 Habitats of high value for the species being evaluated that are unique and irreplaceable on a national basis or in the ecoregion. No loss of existing habitat value should occur.

Resource Category No. 2 Habitats of high value that are relatively scarce or becoming scarce on a national basis or in an Ecoregion. No net loss of in-kind habitat value should occur.

Resource Category No. 3 Habitats of high to medium value that are relatively abundant on a national basis. No net loss of habitat value should occur and loss of in-kind habitat should be minimized.

Resource Category No. 4 Habitats of medium to low value. Loss of habitat value should be minimized.

The proposed alternative would result in a direct loss of aquatic habitat (0.47 ac [0.19 ha]), wetlands (0.03 ac [0.01]) and riparian vegetation (0.42 ac [0.17 ha]) that provides life stage support for aquatic plants, aquatic invertebrates, amphibians, reptiles and water dwelling mammals and migratory birds. The wetlands, riparian and aquatic habitat found in the Acequia project area provides food, habitat and ecological services (e.g. water quality purification, nutrient and chemical transformation, cover) for macroinvertebrates, algae, aquatic plants and animals, mammals, reptiles, and migratory birds. Due to the decreasing amount of aquatic habitat, wetlands and riparian habitat, the loss of these resources will require mitigation as it is classified as a Resource Category No. 2. While most naturally occurring aquatic habitats in the Southwest are often considered Resource Category No. 1, the aquatic habitat quality of the Acequia likely provides fewer services and benefits given the operational maintenance as well as there is some loss of aquatic resources to agricultural fields during irrigation. Therefore, while this aquatic habitat is of high value, in its current condition and operation it is considered as a Resource Category No. 2.

The preferred alternative would place this section of the delivery ditch into a tube to improve efficiency and reduce maintenance, however overflow impacts and maintenance to this section of the Acequia will continue to some extent into the foreseeable future. The historic design of this Acequia is unique in that the diversion groin, guide weir, heading structure, and a portion of the delivery ditch (over 1,200 ft [366 m]) are within the San Juan

River channel and on the east side they align against bedrock. Thus the Acequia is subject to high and low flow events that trigger the need for routine maintenance involving the movement of materials and facility reinforcements that impact the river channel and wildlife habitat. Long-term impacts should be avoided by limiting all permanent project features to the minimum area required, using existing access routes, and selecting less sensitive or previously disturbed areas for any new facilities. The Service recommends that the USACE conduct a formal engineering feasibility assessment of moving the diversion and heading structure to reduce the need for maintenance affecting the river channel as well as reduce the loss of aquatic, riparian and wetland habitat and the need for mitigation.

Loss of riparian habitat should be kept to a minimum. The following mitigation will be necessary for the loss of 0.42 ac of riparian habitat. Dense planting of coyote willow or New Mexico olive whips or poles, and cottonwood poles should be established where adequate amounts of water would be available to ensure successful mitigation. Mitigation should cover the direct removal of vegetation during the construction phase of the project, as well as induced mortality that may occur in future years due to any construction or maintenance impacts. The Service recommends replacing each cottonwood tree lost (~ 6 trees) due to the project at a 10:1 ratio and replacing all other mature standing trees at a 1:1 ratio. The Service recommends planting over 18,232 willow whips or cottonwood as mitigation for the loss of willow, cottonwood, locust, New Mexico olive, and all other woody vegetation lost along the Acequia. We recommend a replacement ratio of 4:1 (in area) for coyote willow resulting in a mitigation area of 1.68 ac (0.7 ha). This planting would comply with the Service mitigation policy of Resource Category No. 2 (i.e., no net loss of in-kind habitat value should occur). Alternatively, the USACE could partner with others in the San Juan River to actively remove nonnative riparian species (Russian olive, salt cedar) in the watershed and provide mitigation trees as part of any replanting efforts within five years.

Filling a portion of the Acequia will eliminate aquatic habitat and the source of water for riparian habitat. The mitigation goal for aquatic habitat (e.g., glides and runs) in the project area is to have no net loss of habitat value as a result of the proposed project. The Service recommends mitigation for the loss of this important fish and wildlife habitat over time. Potential mitigation could include creating pool habitat or deepen existing pools (or other habitat) or enhancing riverine wetlands in the area to restore the prey base for local fish and wildlife. The USACE shall coordinate these mitigation activities with other agencies.

RECOMMENDATIONS

To prevent and reduce project impacts to fish and wildlife resources, the Service recommends the following measures:

1. Conduct a formal engineering feasibility study of possibly moving the heading structure downstream and diversion dam to reduce need for access to Acequia structures and maintenance impacts to San Juan River channel and riparian and wetland habitat.
2. If impacts are unavoidable, mitigate the loss of wetland, riparian and aquatic bottom habitats and monitor the project and mitigation area to evaluate growth and success of revegetated areas for a minimum of 3 years. Implement corrective actions, as necessary.
3. Work with others in the San Juan River valley to maximize the value of the mitigation and help restore local wetlands, riparian vegetation, terrestrial and aquatic habitat.
4. Ensure that the best management practices identified in the Draft EA are implemented. Obtain water quality certification from the New Mexico Environment Department and implement all required activities. Additional monitoring of water quality impacts before, during, and after the project activities as well as best management practices may be necessary.
5. Avoid impacting bald eagles during project activities. Conduct interagency consultation under the Endangered Species Act as necessary. Scarify compacted soils or replace topsoils and re-vegetate all disturbed sites with a suitable mixture of native plants.

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Appendix A. Common and scientific name of plant species potentially occurring within the project area, San Juan County, New Mexico (Brown 1982).

Common Name	Scientific Name
big bluestem	<i>Andropogon gerardi</i>
little bluestem	<i>Schizachyrium scoparium</i>
Indian Grass	<i>Sorghastrum nutans</i>
switch grass	<i>Panicum virgatum</i>
sideoats and other gramas	<i>Bouteloua</i> spp.
sand sagebrush	<i>Artemisia filifolia</i>
soapweed yucca	<i>Yucca glauca</i>
mesquites	<i>Prosopis glandulosa</i> , <i>P. torreyana</i>
fourwing saltbush	<i>Atriplex canescens</i>
rabbit brush	<i>Chrysothamnus</i> spp.
snakeweed	<i>Gutierrezia</i> spp.
cholla and pricklypear cactii	<i>Opuntia</i> spp.
threadleaf groundsel	<i>Senecio longilobus</i>
snakeweed	<i>Gutierrezia sarothrae</i>
galleta grass	<i>Hilaria jamesii</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>
western wheatgrass	<i>Agropyron smithii</i>
hedgehogs	<i>Echinocereus</i> spp.
prickly-pears and chollas	<i>Opuntia</i> spp.
Cottonwood	<i>Populus deltoidesi</i>
coyote willow	<i>Salix exigua</i>
Russian olive	<i>Eleagnus angustifolia</i>
salt cedar	<i>Tamarix</i>
Siberian elm	<i>Ulmus pumila</i>
black locust	<i>Robinia pseudoacacia</i>
honey Locust	<i>Gleditisia triacantos</i>

Appendix B. Common and Scientific Names of Fish Species Collected in the San Juan River
Project Area Downstream of Navajo Reservoir in San Juan County, New Mexico

Common Name	Scientific Name
red shiner	<i>Cyprinella lutrensis</i>
common carp	<i>Cyprinus carpio</i>
fathead minnow	<i>Pimephales promelas</i>
speckled dace	<i>Rhinichtys osculus</i>
black bullhead	<i>Ameiurus melas</i>
channel catfish	<i>Ictalurus punctatus</i>
bluegill	<i>Lepomis macrochirus</i>
largemouth bass	<i>Micropterus salmoides</i>
white crappie	<i>Pomoxis annularis</i>
walleye	<i>Stizostedion vitreum</i>
western mosquitofish	<i>Gambusia affinis</i>
flannelmouth sucker	<i>Catostomus latipinnis</i>
bluehead sucker	<i>Catostomus discobolus</i>
Colorado pikeminnow	<i>Ptychocheilus lucius</i>
razorback sucker	<i>Xyrauchen texanus</i>
roundtail chub	<i>Gila robusta</i>
mottled sculpin	<i>Cottus bairdi</i>
rainbow trout	<i>Oncorhynchus gairdneri</i>
brown trout	<i>Salmo trutta</i>
kokanee salmon	<i>Oncorhynchus nerka</i>

Appendix C. Common and scientific name of avian species potentially occurring within the project area, San Juan County, New Mexico (Schmitt 1973).

Common Name	Scientific Name
southwestern willow flycatcher	<i>Empidonax traillii</i>
bald eagle	<i>Haliaeetus leucocephalus</i>
mourning dove	<i>Zenaida macroura</i>
scaled quail	<i>Callipepla squamata pallida</i>
Gambel's quail	<i>Callipepla gambelii</i>
red-tailed hawk	<i>Buteo jamaicensis</i>
swainson's hawk	<i>Buteo swainsoni</i>
ferruginous hawk	<i>Buteo regalis</i>
golden eagle	<i>Aquila chrysaetos</i>
marsh hawk	<i>Circus cyaneus</i>
prarie falcon	<i>Falco mexicanus</i>
sparrow hawk	<i>Falco sparverius</i>
common nighthawk	<i>Chordeiles minor</i>
white-throated swift	<i>Aerinautes saxatalis</i>
black-chinned hummingbird	<i>Archilichus alexandri</i>
broad-tailed hummingbird	<i>Selasporus platycercus</i>
rufous hummingbird	<i>Megasceryle alcyon</i>
red shafted flicker	<i>Colaptes cafer</i>
red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
eastern kingbird	<i>Tyrannus tyrannus</i>
western kingbird	<i>Tyrannus verticalis</i>
western flycatcher	<i>Empidonax difficilis</i>
western wood pewee	<i>Contopus sordidulus</i>
horned lark	<i>Eremophila alpestris</i>
violet-green swallow	<i>Tachycineta thalassina</i>
rough winged swallow	<i>Stelgidopteryx ruficollis</i>
barn swallow	<i>Hirundo rustica</i>
scrub jay	<i>Aphelocoma coerulescens</i>
pinyon jay	<i>Gymnorhinus cyanocephala</i>
black-capped chickadee	<i>Parus atricapillus</i>
black-billed magpie	<i>Pica pica</i>
american kestrel	<i>Falco sparverius</i>
ring necked pheasant	<i>Phasianus colchicus</i>

Appendix C (continued). Common and scientific name of avian species potentially occurring within the project area, San Juan County, New Mexico (Schmitt 1973).

Common Name	Scientific Name
american avocet	<i>Recurvirostra americana</i>
ring-billed gull	<i>Larus delawarensis</i>
yellow-billed cuckoo	<i>Coccyzus americanus</i>
belted kingfisher	<i>Ceryle alcyon</i>
loggerhead shrike	<i>Lanius ludovicianus</i>
gray vireo	<i>Vireo vicinior</i>
killdeer	<i>Charadrius vociferus</i>
spotted sandpiper	<i>Actitis macularia</i>
warbling vireo	<i>Vireo gilvus</i>
virginia's warbler	<i>Vermivora virginiae</i>
yellow warbler	<i>Dendroica petechia</i>
MacGillivray's warbler	<i>Oporornis tolmiei</i>
yellowthroat	<i>Geothlypis trichas</i>
yellow-breasted chat	<i>Icteria virens</i>
yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>
scott's oriole	<i>Icterus parisorum</i>
bullock's oriole	<i>Icterus bullockii</i>
brewer's blackbird	<i>Euphagus cyanocephalus</i>
boat-tailed grackle	<i>Cassidix mexicanus</i>
black-headed grosbeak	<i>Pheucticus melanocephalus</i>
blue grosbeak	<i>Guiraca caerulea</i>
indigo bunting	<i>Passerina cyanea</i>
lazuli bunting	<i>Passerina amoena</i>
pine siskin	<i>Spinus pinus</i>
lark bunting	<i>Calamospiza melanocorys</i>
lark sparrow	<i>Chondestes grammacus</i>
black-throated sparrow	<i>Amphispiza bilineata</i>
sage sparrow	<i>Amphispiza belli</i>
chipping sparrow	<i>Spizella passerina</i>
house sparrow	<i>Passer domesticus</i>
house finch	<i>Carpodacus mexicanus frontalis</i>
brown headed cowbird	<i>Molothrus ater</i>
western meadowlark	<i>Sturnella neglecta</i>

Appendix C (continued). Common and scientific name of avian species potentially occurring within the project area, San Juan County, New Mexico (Schmitt 1973).

Common Name	Scientific Name
long-billed marsh wren	<i>Telmatodytes palustris</i>
rock wren	<i>Salpinctes obsoletus obsoletus</i>
mockingbird	<i>Mimus polyglottos</i>
turkey vulture	<i>Cathartes aura</i>
norther harrier	<i>Circus cyaneus hudsonius</i>
screech owl	<i>Otus asio</i>
great horned owl	<i>Bubo virginianus</i>
burrowing owl	<i>Speotyto cunicularia</i>
long-eared owl	<i>Asio otus</i>
common raven	<i>Corvus corax sinuatus</i>
bendire's thrasher	<i>Toxostoma bendirei</i>
sage thrasher	<i>Oreoscoptes montanus</i>
american robin	<i>Turdus migratorius</i>
cedar waxwing	<i>Bombycilla cedrorum</i>
loggerhead shrike	<i>Lanius ludovicianus</i>
common starling	<i>Sturnus vulgaris</i>
pied-billed grebe	<i>Podilymbus podiceps</i>
great blue heron	<i>Ardea herodias</i>
green heron	<i>Butorides virescens</i>
snowy egret	<i>Leucophoyx thula</i>
black-crowned night heron	<i>Nycticorax nycticorax</i>
least bittern	<i>Ixobrychus exilis</i>
american bittern	<i>Botaurus lentiginosus</i>
white-faced ibis	<i>Plegadis chihi</i>
canada goose	<i>Branta canadensis</i>
mallard	<i>Anas platyrhynchos</i>
Gadwall	<i>Anas strepera</i>
cinnamon teal	<i>Anas cyanoptera</i>
american widgeon	<i>Marca americana</i>
shoveler	<i>Spatula clypeata</i>
european starling	<i>Sturnus vulgaris</i>
grey catbird	<i>Dumetella carolinensis ruficrissa</i>
house wren	<i>Troglodytes aedon parkmannii</i>
bewick's wren	<i>Thryomanes bewickii</i>

Appendix C (continued). Common and scientific name of avian species potentially occurring within the project area, San Juan County, New Mexico (Schmitt 1973).

Common Name	Scientific Name
common gallinule	<i>Callinula chloropus</i>
american coot	<i>Fulica americana</i>
dark eyed junco	<i>Junco hyemalis</i>
western tanager	<i>Piranga ludoviciana</i>
blue-winged teal	<i>Anas discors</i>
Mississippi kite	<i>Actinia mississippiensis</i>
virginia rail	<i>Rallus limicola</i>
sora	<i>Porzana carolina</i>

Appendix D. Common and scientific name of mammal species potentially occurring within the project area, San Juan County, New Mexico (Findley *et al.* 1975).

Common Name	Scientific Name
pronghorn	<i>Antilocapra americana</i>
mule deer	<i>Odocoileus hemionus</i>
red fox	<i>Vulpes vulpes</i>
plains pocket mouse	<i>Perognathus flavescens</i>
desert cottontail rabbit	<i>Sylvilagus audubonii</i>
black-tailed jack rabbit	<i>Lepus californicus</i>
spotted ground squirrel	<i>Spermophilus spilosoma</i>
white-tailed antelope squirrel	<i>Ammospermophilus leucurus</i>
rock squirrel	<i>Spermophilus variegatus grammurus</i>
gunnison's prairie dog	<i>Cynomys gunnisoni</i>
botta's pocket gopher	<i>Thomomys bottae</i>
silky pocked mouse	<i>Peregnathus flavus</i>
ords kangaroo rat	<i>Dipodomys ordii</i>
banner-tailed kangaroo rat	<i>Dipodomys spectabilis</i>
western harvest mouse	<i>Reithrodontomys megalotis</i>
deer mouse	<i>Peromyscus maniculatus</i>
brush mouse	<i>Peromyscus boylii rowleyi</i>
pinon mouse	<i>Peromyscus truei</i>
northern grasshopper mouse	<i>Onychomys leucogaster</i>
white-throated woodrat	<i>Neotoma albigula</i>
Stephen' woodrat	<i>Neotoma stephensi</i>
mexican wood rat	<i>Neotoma mexicana</i>
bushy-tailed wood rat	<i>Neotoms cinerea</i>
house mouse	<i>Mus musculus</i>
meadow vole	<i>Microtus pennsylvanicus</i>
porcupine	<i>Erethizon dorsatum</i>
coyote	<i>Canis latrans</i>
kit fox	<i>Vulpes macrotis</i>
grey fox	<i>Urocyon conereoargenteus scottii</i>
striped skunk	<i>Mephitis mephitis</i>
muskrat	<i>Ondatra zibethicus</i>
Colorado chipmunk	<i>Eutamias Quadrivittatus</i>
beaver	<i>Castor canadensis</i>
mountain lion	<i>Felis concolor</i>
bobcat	<i>Lynx rufus</i>

Appendix E. Common and scientific name of reptile and amphibians species potentially occurring within the project area, San Juan County, New Mexico (Degenhardt *et al.* 1996).

Common Name	Scientific Name
gopher snake	<i>Pituophis melanoleucus</i>
western hognose snake	<i>Heterodon nasicus</i>
trans-pecos rattle snake	<i>Bogerthophis subocularis</i>
western rattlesnake	<i>Crotalus viridis</i>
western terrestrial garter snake	<i>Thamnophis elegans</i>
western plains milk snake	<i>Lampropeltis triangulum</i>
blackneck garter snake	<i>Thamnophis crytopsis</i>
plains spadefoot	<i>Spea bombifrons</i>
New Mexico spadefoot	<i>Spea multiplicata</i>
bullfrog	<i>Rana catesbeiana</i>
northern leopard frog	<i>Rana pipiens</i>
lesser earless lizard	<i>Holbrookia maculata</i>
collard lizard	<i>Crotaphytus collaris</i>
lesser earless lizard	<i>Holbrookia maculate</i>
eastern fence lizard	<i>Sceloporus undulatus</i>
western whiptail	<i>Cnemidophorus tigris</i>
plateau striped whiptail	<i>Cnemidophorus vorex</i>
least striped whiptail	<i>Cnemidophorus inornatus</i>
side-blotched lizard	<i>Uta stansbutiana</i>
tree lizard	<i>Urosaurus ornatus</i>
sagebrush lizard	<i>Sceloporus graciosus</i>
short horned lizard	<i>Phrynosoma douglasii</i>
painted turtle	<i>Chrysemys picta</i>
western chorus frog	<i>Pseudacris triseriata</i>
woodhouse's toad	<i>Bufo woodhousii</i>
tiger salamander	<i>Ambystoma tigrinum</i>

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APPENDIX D

Public and Agency Comments on the Draft EA

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5.0 LIST OF PREPARERS, CONSULTATION, AND COORDINATION

5.1 LIST OF PREPARERS

- Ben Alanis, Corps, Program Manager for Acequia Rehabilitation Program
- Patricia Phillips, Corps, EA Project Manager
- Gregory Everhart, Corps, Archaeologist
- Robin Brandin, SAIC, QA/QC
- Ellen Dietrich, SAIC, Project Manager
- Neal Ackerly, Dos Rios Consultants, Inc., Archaeologist
- David Dean, SAIC, Biologist
- Heather Gordon, SAIC, Environmental Scientist/GIS Specialist
- Winifred Devlin, SAIC, Environmental Scientist/Editor

5.2 COORDINATION

Agencies, tribes, and entities contacted formally or informally in preparation of this EA include:

- Comanche Indian Tribe
- Gonzales-Gurule Acequia, Henry Jacquez, majordomo
- Hopi Tribe
- Jicarilla Apache Nation
- Kiowa Tribe of Oklahoma
- Natural Resources Conservation Service
- Navajo Nation
- New Mexico Department of Energy, Minerals, and Natural Resources
- New Mexico Department of Game and Fish
- New Mexico Environment Department
- New Mexico Office of the State Engineer
- New Mexico State Historic Preservation Office
- Pueblo of Pojoaque
- Pueblo of San Ildefonso
- Pueblo of San Juan
- Pueblo of Santa Clara
- Pueblo of Taos
- U.S. Fish and Wildlife Service

Appendix A contains a copy of the tribal consultation letter with a list of recipients. It also contains responses from the Hopi Tribe and Jicarilla Apache Nation and a letter of request to the State Historic Preservation Office for an effects determination, with a signature documenting SHPO concurrence.

Comments on the Draft EA were received from NMED, USFWS, and NMGF. All comments were considered before preparing this Final EA. Copies of the comment letters are in **Appendix B**.

GOVERNOR
Bill Richardson



DIRECTOR AND SECRETARY
TO THE COMMISSION
Bruce C. Thompson, Ph.D.

Tod Stevenson, Deputy Director

STATE OF NEW MEXICO DEPARTMENT OF GAME & FISH

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Zia Pueblo, NM

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Tijeras, NM

M. H. "Dutch" Salmon, Commissioner
Silver City, NM

August 23, 2006

Ms. Karen Yori
Blue Earth Ecological Consultants, Inc.
1345 Pacheco Street
Santa Fe, New Mexico 87505

Re: Environmental Assessment for the Turley-Manzanares Acequia Rehabilitation Project, San Juan County,
New Mexico
NMGF No. 11004

Dear Ms Yori:

In response to the Notice of Availability of the Environmental Assessment (EA) and Finding of No Significant Impact for the Turley-Manzanares Acequia Rehabilitation Project, the New Mexico Department of Game and Fish (Department) has reviewed the EA and would like to re-iterate some scoping comments we made regarding the project in June 2005 (reference NMGF No. 10126).

The NMDGF recommends against the use of gabions in acequia rehabilitation projects. The use of gabions for in-stream structures are undesirable due to their poor stability and unreliability. Gabions generally have low biotic potential for in-stream habitat. These type of structures create unwanted debris in the stream when the gabion baskets inevitably come apart and wash downstream. The use of gabions may result in higher long-term maintenance and replacement costs, as compared to other designs.

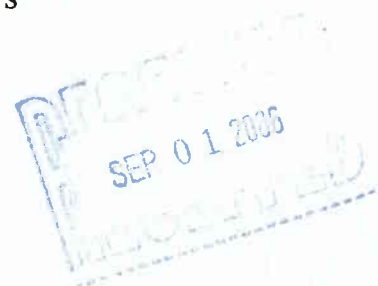
Thank you for the opportunity to comment on the EA for the Turley-Manzanares Acequia Rehabilitation Project. If you have any questions please contact Randy Floyd at (505) 476-8091 or randy.floyd@state.nm.us.

Sincerely,

Lisa Kirkpatrick, Chief
Conservation Services Division

LK/rlf

xc: Adam Zerrenner, New Mexico Ecological Services Field Supervisor, USFWS
Brian Gleadle, NW Area Operations Chief, NMGF
Mark Olson, NW Area Habitat Specialist, NMGF



RESPONSES TO COMMENTS ON DRAFT EA

- Only one comment was received in response to the draft EA's public availability.

Agency	Comment #	Response to Comment
New Mexico Department of Game and Fish	1. The NMDGF recommends against the use of gabions in acequia rehabilitation projects. The use of gabions for in-stream structures are undesirable due to their poor stability and unreliability. Gabions generally have low biotic potential of in-stream habitat. These types of structures create unwanted debris in the stream when the gabion baskets inevitably come apart and wash downstream. The use of gabions may result in higher long-term maintenance and replacement costs, as compared to other designs.	The engineered design calls for the gabions to be "concrete capped", which would reduce the likelihood of failure, and with proper maintenance by the acequia association members will <u>not</u> inevitably come apart."

